

# JUNIOR MECHANICS AND MODEL ★ AIRPLANE NEWS



MARCH  
1930



## CLOUD-HOPPING" PIRATES

*Boy Hero Foils Air Mail Brigands*

By T. A. BRODERICK

*Continuing-*  
COURSE IN MODEL AIRPLANE  
DESIGNING

How To Build (FULL-SIZED) — CURTISS ARMY FALCON AND  
SINGLA 655 FLYING BOAT



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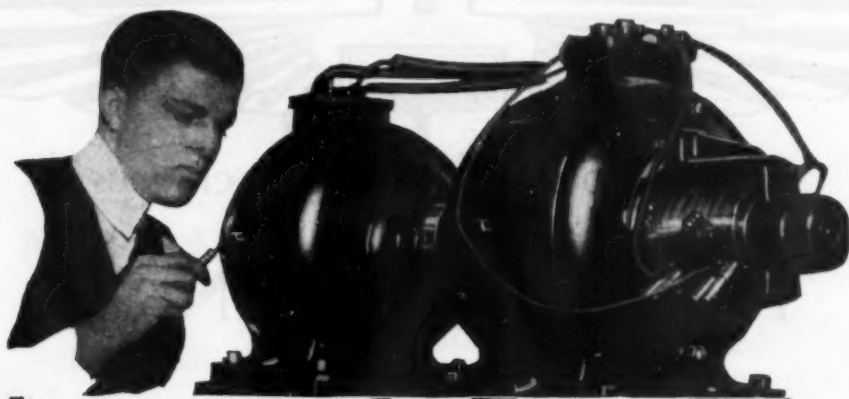
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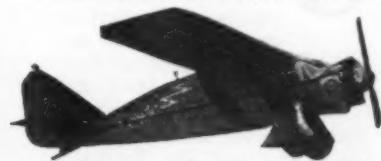
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# "Cloud-Hopping" Pirates

## A Boy Hero of the Air Foils U. S. Air Mail Brigands

By

T. A. BRODERICK

**G**LINTING like a silver eagle in the late afternoon sun, the whirlwind Curtiss swooped down on the air mail landing field at Salt Lake City. Down, down she came, and when it seemed that she must nose dive into the sandy soil, she flattened out, gradually losing her flying speed, and slowed into a perfect three-point landing.

As the ground crew rushed across the field to wheel the plane to the hangars, two figures emerged from the cockpit. The first was Spike Hennessy, crack mail pilot of the Morgan Field. He removed his helmet and slapped his somewhat smaller companion on the back.

"Great work, son," he shouted jovially, his voice carrying clear across the tarmac, so accustomed was he to talking against the roar of a throbbing engine. "Great work. You'll be as good as Lindbergh one of these days."

Jimmy McCabe looked up at the speaker, his face beaming with pleasure at this praise from his pal and instructor.

"No kidding, Spike," he asked, his tone filled with tremulous excitement. "You really think so?"

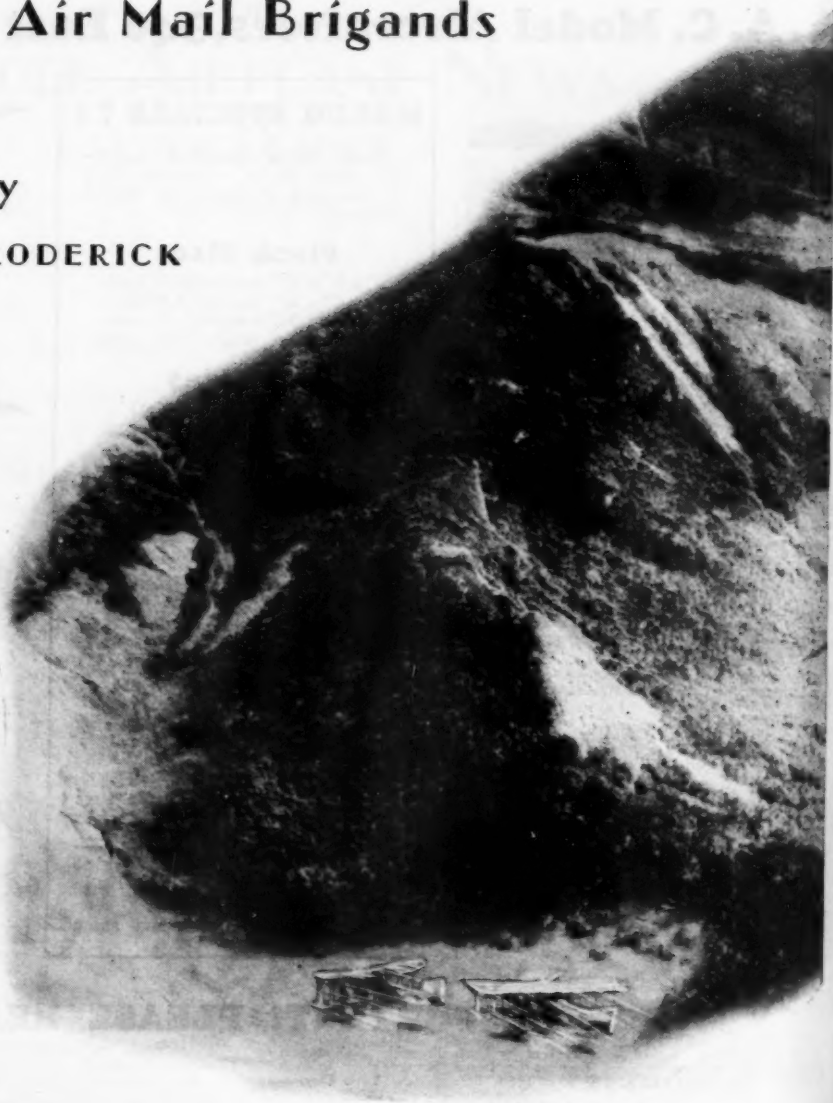
"Think so? Of course I think so. When I'm resting in the Aged Pilots' Home you'll be making me proud."

They walked across the field together and Jimmy McCabe's clear blue eyes shone with pleasure, as he considered Spike's words.

As they removed their heavy, fur-lined garments in Spike's quarters, Jimmy once again brought up the subject about which they had argued for weeks.

"Why can't I get my license now, Spike, and get a job running mail?"

Spike frowned.



"What do you want to run mail for?" he demanded.

"Gee, Spike, you're always asking me that. I've told you a million times why. I want to fly like you. I want to work for Uncle Sam, and get the mail through. That's the sort of a job I'd like. Working for your country, having adventures, going flying every day—and getting paid for it."

Spike snorted in disgust. This was the only point upon which he and his twenty-year-old protégé disagreed.

"Don't let 'em kid you, son. It's a dull, monotonous job. All the adventure you get is to be bawled out by a field super for being ten minutes late with the sacks, and as for working for Uncle Sam, it's the bunk. It's a private contract job. You earn two dollars for every one they pay you. If I knew anything but flying I'd





Jimmy was baffled!  
Was that Spike?  
What was the other  
plane doing there?

No one took Jimmy's aerial aspirations seriously at Morgan Field until the advent of Spike Hennessy. Spike had arrived with a reputation built up by his combat work in France, and augmented by two years as the ace pilot of a crack passenger line.

Spike liked Jimmy at once, and the feeling was reciprocated. To Jimmy, who had been an orphan since his eighth birthday, Spike took the place of both father and friend. He taught him the serious game of flying and the even more serious game of life. But one fly remained in the ointment. Spike had sworn by all the Gods of Aviation that he never would permit him "to throw his life away as a mail pilot."

However, as youth ever does, he cast this worry aside and became his usual sparkling self. A blue eyed, curly headed, slim, muscular youth of twenty—glorious in his own superb health—naturally resists depression as a gale resists a six cylinder Wasp.

**A**BOUT eight o'clock that evening, Jimmy said a cheerful hello to the watchman as he returned to the hangar. Invariably before Spike started on his run, Jimmy would stock the cockpit with sandwiches and such paraphernalia as would be required on the trip. He also had acquired a habit of looking over the ship to see if all was in order despite the fact that she would be thoroughly examined by a competent mechanic before the take-off.

Tonight his examination was even more careful than usual. For tomorrow was to bring the most important mission with which Spike had been entrusted since his arrival at Morgan Field. He was carrying some twenty thousand dollars in gold bullion to Cheyenne; a shipment necessitated by a threatened bank run in that city.

*Over the snow capped mountains to Cheyenne!* The words sang in Jimmy's ears. He would have given anything in the world to go along with Spike.

He stowed away the package he was carrying under the seat of the cockpit, cast a loving eye over the instrument board, felt each strut in turn and resolved

quit cold tomorrow."

Jimmy was silent. The exultation he had known a moment ago was crushed. He always hated to hear his idol talk this way about the profession and the country he loved.

"So long, kid." Spike was at the door.

"Get my sandwiches and other stuff in the plane tonight. I'm taking off with that gold shipment at six in the morning. See you tomorrow night." He poked his head back through the door.

"And forget that bunk about flying mail. Get yourself a real job with a real firm."

Jimmy dressed slowly and as though in answer to Spike's last words, he repeated to himself the motto of the United States Postal Service painted flamboyantly outside the super's office: "Neither rain nor snow nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds."

Jimmy walked home from the field lost in deep meditation. This almost daily speech of Spike's about flying and the government was worrying him. Spike was to him what Lindbergh is to every other American youth—a fearless, stalwart rider of the skies, in whose character he hated to find a flaw.

Since Jimmy's graduation from the Salt Lake City High School, he had been doing clerical work at the field. He had always wanted to fly, and lacking the money for lessons, had jumped at the chance to work near his chosen profession.



to be at the field in the morning prior to the take-off.

As he reached the hangar door preparatory to leaving, he found the watchman gone on his hourly round. He was about to head down the road toward town, when he heard the noise of a window opening behind him in the hangar. Every sense became alert as he crouched beside the sliding doors with his eye glued to the crack between them.

Through the small high window in the rear, a black figure came into view, straddled the sill, and slithered into the darkness of the barn-like structure. Jimmy's body prepared for action at precisely the same moment that his mind counseled him to wait. And wait he did. Without hesitation the man's form, now silhouetted against the small window, made for Spike's plane. Jimmy watched in utter silence, mentally speculating as to the fellow's motive.

The intruder, coming to Spike's powerful Curtiss, disappeared from view on the far side of the ship. Suddenly there came the sharp clink of metal striking metal.

Jimmy hesitated no longer. Someone was tampering with the plane!

He flung the door wide open and charged into the darkness. In his angry indignation caution was flung to the winds. Rounding the ship's tail, he was met by a terrific right upon his jaw, as the kneeling figure straightened up. He went sprawling on the oil stained floor. His adversary with a muffled curse, bent quickly down thrusting his hand under the fuselage. Again came that subdued sharp clink, as Jimmy arose, and, learning from experience, approached more carefully this time.

Once again as he advanced the man stood up. This time with a Stillson wrench held firmly in his right hand. Down it came and in a twinkling of an eye up went Jimmy's guard. That alone saved him. Even the glancing blow that landed almost broke his arm. He swung his right into action even as he staggered and heard with satisfaction the smacking thud as it met its mark.

Its force, however, had been considerably slowed up by the fact of his reeling back as he delivered the punch. Before he could bore in again, his foe slipped past him and made for the open door of the hangar. Jimmy recovered and, with a shout that he hoped would

reach the ears of the watchman, raced after him.

Round the side of the hangar went the tall dark figure, Jimmy following. His arm ached dully, and pain shot from wrist to elbow as he raced across the field into the night.

Beyond the rear of the buildings they sped toward the State Road leading to town. As the fugitive leaped the hedge at the roadside, Jimmy was some hundred feet behind him. Gaining the road, he heard the hum of a powerful automobile engine. In another thirty seconds two glaring headlights struck him full in the face as, gathering momentum at every turn of her wheels, a heavy roadster rushed towards him. He stepped to the side of the road, tensing his muscles until the car was about to pass him. With the litheness of a tiger he jumped onto the now swiftly moving running board, and clambered over the door into the seat.

THE driver released the wheel to grapple with him. Jimmy met the onslaught by blocking his wildly swung right and countering with a short jab to the heart. The car careened crazily down the road. Jimmy went into a clinch as his foot sought the brake, found it and jammed it hard enough to kill the engine.

The fight had by this time resolved itself into a wrestling match. Jimmy's breath came in gasps as his foe attempted to force him back down across the door top. A dark, saturnine countenance threw a vile oath in his face. His arm felt as though a thousand knives were piercing it. The other's superior weight was beginning to tell.

With a superhuman effort, Jimmy tossed his legs skyward with the result that both of them were catapulted head over heels onto the roadside. Over and over they rolled, each striving for a hold that would turn the tide of battle. Jimmy's injured arm was a living pain. His adversary seemed to sense this, for giving

this, for giving Jimmy's wrist a terrific twist he wrenched himself free.

In a second Jimmy was upon him again. But even as he came in, the mysterious stranger reached in his coat pocket, raised his hand aloft—and down came the dull, black butt of an automatic. Jimmy groaned and crumpled under the blow.

"Well, nosey," muttered the stranger. "I guess you found out what happens to guys who don't mind their own business. After I fix you up, I'll go back to the field and finish the job."

(Continued on page 46)



"Where's Spike Hennessy?" demanded Jimmy



**T**HIS model is a copy of the Falcon as used by the U. S. Army Air Corps for attack and observation duty, with one exception, and that is that the rear, or observer's cockpit has been left out to strengthen the model for flying purposes and so that when the rubber motor is fully wound up, the ship will not buckle.

### Fuselage

In the construction of the fuselage you will notice that the nose or motor mount is removable. The nose is made from formers 1, 2 and 3 as shown in drawing 4 and are cut from the 1/16" x 3" balsa sheet. Former 2 has a spruce piece laid in to add strength and act as a fastening point for the metal clip, which is made from No. 9 music wire.

The bamboo stringers are cut from 1/4" bamboo strips and should be made as thin as possible and fastened in place with ambroid, as shown in the different drawings. Be sure to leave the opening on the underside, as shown in drawing 1, so that when the ship is completed you will be able to insert and adjust the motor stick. The balsa stringers which alternate with the bamboo are made from the 1/16" square balsa and must be cut to the correct lengths from the 24" pieces.

The other main part of the fuselage which contains the cockpit is then built up from the formers 4 to 9 inclusive. All these formers with the exception of 9 are made from 1/16" x 3" sheet balsa. Former 9 is made from a piece of 1/32" spruce. Former 12 acts in two capacities—as tail post and also the main support for your rudder. The 1/32" bamboo stringers are spaced as shown in the drawing 1, alternating with the 1/16" square balsa as in the construction of the nose.

### Necessary Materials

6 pieces 1/16" x 1/16" x 24"	balsa	stringers
2 pieces 1/16" x 3" x 12"	balsa	fuselage formers
4 pieces 1/16" x 1-3/4" x 12"	balsa	ribs and small parts
2 pieces 1/16" x 3/16" x 24"	balsa	leading edges
1 piece 1/32" x 1-3/4" x 4-1/2"	balsa	cockpit former
1 piece 1/4" x 3/8" x 8"	balsa	wing mounts
4 pieces 1/16" x 1/8" x 12"	balsa	spars and formers
4 pieces 1/8" x 1/8" x 24"	balsa	spars and trailing edges
2 pieces 1/8" x 3/16" x 24"	balsa	leading edges
1 piece 3/4" x 1-1/4" x 7-1/4"	balsa	propeller block
1 piece 1/32" x 1-1/8" x 4"	spruce	former 9 and 2 fill-in
1 piece 1/8" x 1/4" x 13-1/2"	spruce	motor stick
5 pieces 1/16" x 1/4" x 11-1/2"	bamboo	stringers and landing gear
1 piece 12" long	1/8" round wood	nose mount dowels
2 feet	No. 9 music wire	fitting and landing gear
2 sheets	Japanese tissue	coverings
1 bottle	ambroid	gluing
1 bottle	banana oil	doping
1 pair	2" celluloid wheels	
1 large	thrust bearing	
10 feet	1/8" flat rubber	
6	1/4" copper washers	

### Tail Group

The tail group consists of the elevator, stabilizer and rudder. The rudder is built up by cutting out the formers 10, 11, 13 and two of 14, which are all set in place as shown in drawing 2, and fastened with ambroid. Former 12 already has been placed in the building of the fuselage as explained before. The rudder is then shaped as shown in the drawing with edges of 1/32" split bamboo bent to shape by heating the bamboo over a lighted candle.

Elevator and stabilizer are built together, the main spar 15 being fastened in place with ambroid as shown in drawing 3. On the tail post the shape is secured by making up

formers 16, 17, 18, 19 and 20, which are all cut to size and shape as shown in drawing 6. Former 16 is made from the 1/16" sheet balsa left over from the rib scrap. Former 17 is made from 1/16" x 3/16" balsa.

Be sure to make two of each of the formers, one being used on each side. The edges are made from 1/32" split bamboo bent to shape as in the rudder and fastened in place with ambroid cement, as shown in drawing 6. Be sure that the leading edge is kept to the correct point as shown in drawing 2.

### Wing Mounts

The wing mounts are made to the correct size as shown in drawing 1 from 1/4" x 3/4" x 8" balsa. Make two of these mounts and be sure to make them "opposite". One is for the left hand side of the fuselage and the other is for the right hand side of the fuselage. These are then fastened with ambroid to formers 5 and 7 as shown in drawing 1. The bottom edge is 1/8" above the bottom of former 6 and 1/16" above the bottom of former 5.

## How to Build a Curtiss Falcon Biplane

A Real Flying Model of the U. S. Army Air Corps Attack and Observation Plane



### Cockpit

The cockpit is shaped with  $1/32''$  balsa, cut to shape as shown in drawings 1 and 2 at point "X". Make two and fasten with ambroid between formers 6 and 7 on top, with the  $1/8''$  ends meeting at the top of former 6. Small pins may be used to hold in place until ambroid is dry.

### Landing Gear

Make the landing gear from two pieces of  $1/16''$  square split bamboo bent to correct shape as shown in drawing 8 and then ambroid it in place against formers 4 and 6, being sure that the bottom ends are 4" apart and are of equal distance from the fuselage. The center brace is bent to shape from No. 9 music wire as shown in the drawing 8. The one inch ends are left to act as wheel axles. The brace is ambroided in place with the top to former 5 and the bamboo members of the landing gear. The two celluloid wheels are held on to the axle by small copper washers and small balsa blocks ambroided in place as shown in drawing 8.

### Tail Skid

The tail skid is made from  $1/16''$  square bamboo, bent to the correct shape as shown in drawing 2 by the heat process explained before. The two pieces are bound together with thread and then ambroided. Ambroid the tail skid in position as shown in the drawing. The correct location is between formers 8 and 9 after cutting bottom stringers as shown in the drawing. The piece of stringer behind former 9 is then fastened to the back of the brace piece of the tail skid.

Balsa stringers ( $1/16''$ ) are then spaced with bamboo stringers as in the construction of the nose piece. After the entire fuselage is dry, start covering by fastening on the Japanese silk tissue. Banana oil or thin white paste may be used for fastening to the fuselage and after covering, give the entire fuselage a coat of banana oil as a dope to tighten the covering.

### Wings

Wing ribs are cut from the  $1/16'' \times 1 3/4'' \times 12''$  balsa, using a sharp knife or razor blade as a tool. These ribs are shown in drawing 5 and you will notice that there are three different size ribs. The largest are for the upper wings and the other two are used for the lower wings.

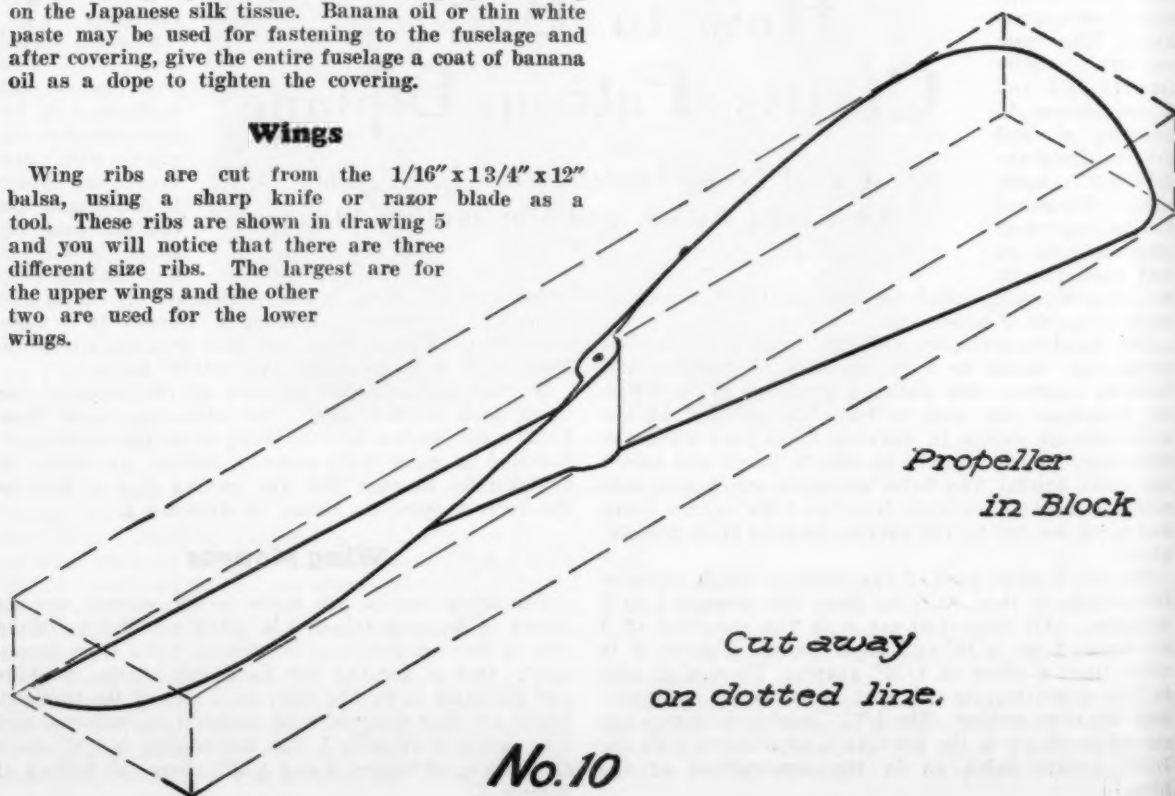
Take a piece of  $1/8'' \times 1/8'' \times 24''$  and mark off your rib positions. Then ambroid the four center ribs in place and let dry. Now nick the sides of this  $1/8'' \times 1/8''$  piece at a point against the outside ribs that have just been put in place and shape to position for a nine degree sweepback and one degree dihedral angle as shown in the drawings.

The leading edge is made from  $1/16'' \times 3/16''$  balsa and is attached to the four center ribs as shown in drawings 5 and 6. The nicks are also made in the leading edge as was done with the main spar so that a sweepback and dihedral angle is maintained. The other ribs are now put on and ambroided in place, making sure that all ribs run parallel with one another. The trailing edge made from  $1/8'' \times 1/8''$  balsa is then set in position as shown in the drawing, after small grooves are cut for the ribs to set in. After this part of the wing construction is dry, the wing tips made from  $1/32''$  split bamboo heated and bent to shape, are put on and fastened with ambroid to the leading and trailing edges, as shown in drawings 5 and 6. The ends of the spars are sandpapered to secure the correct taper at the wing tips. The lower wings are built up in the same manner as the upper wing just described, except that the spars are made from  $1/16'' \times 1/8''$  and there is no sweepback.

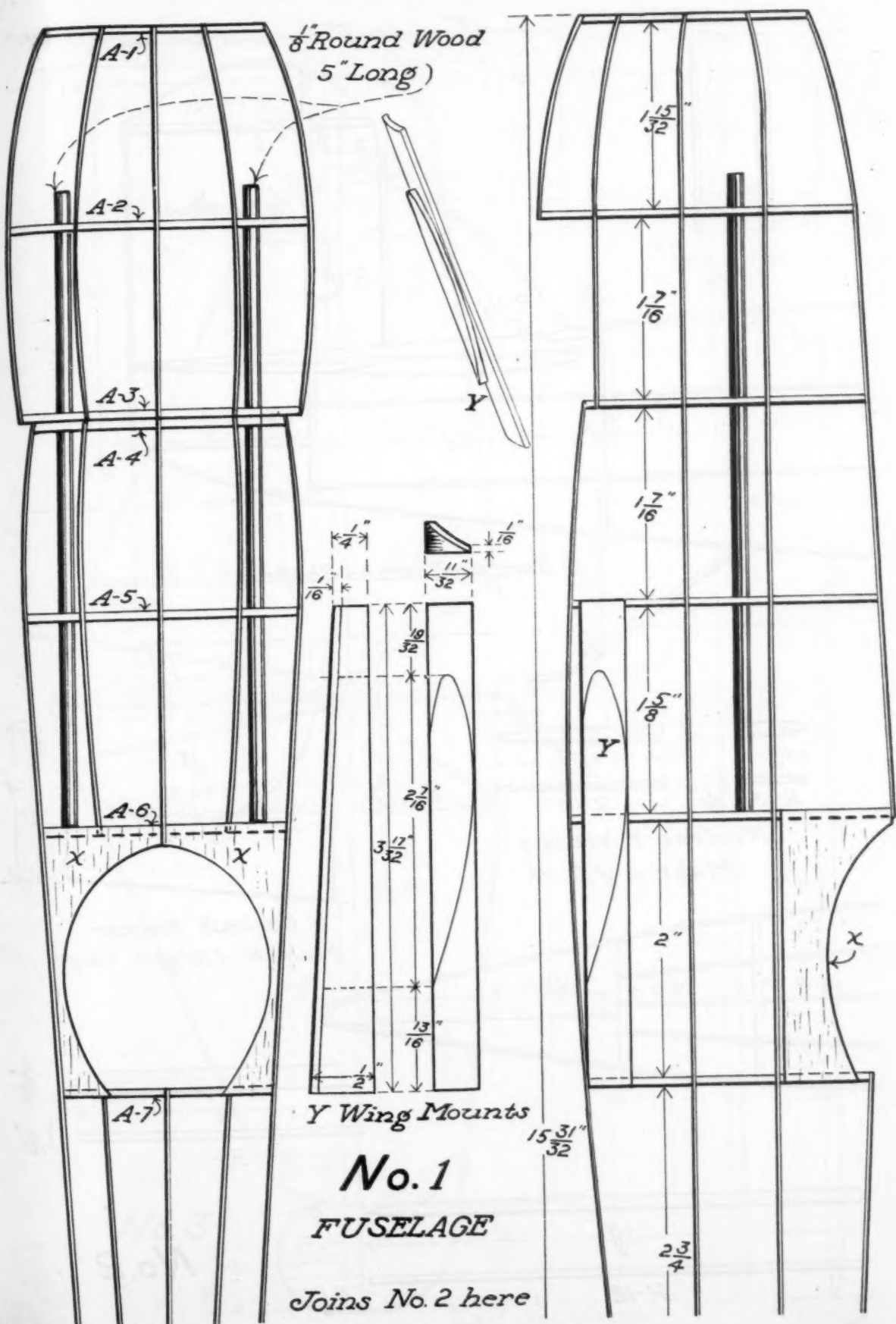
Drawing 7 shows the construction and necessary parts to be used. After the upper and lower wings have had time to dry, cover both with Japanese silk tissue and give a coat of banana oil as a dope. Place aside to dry out.

### Struts

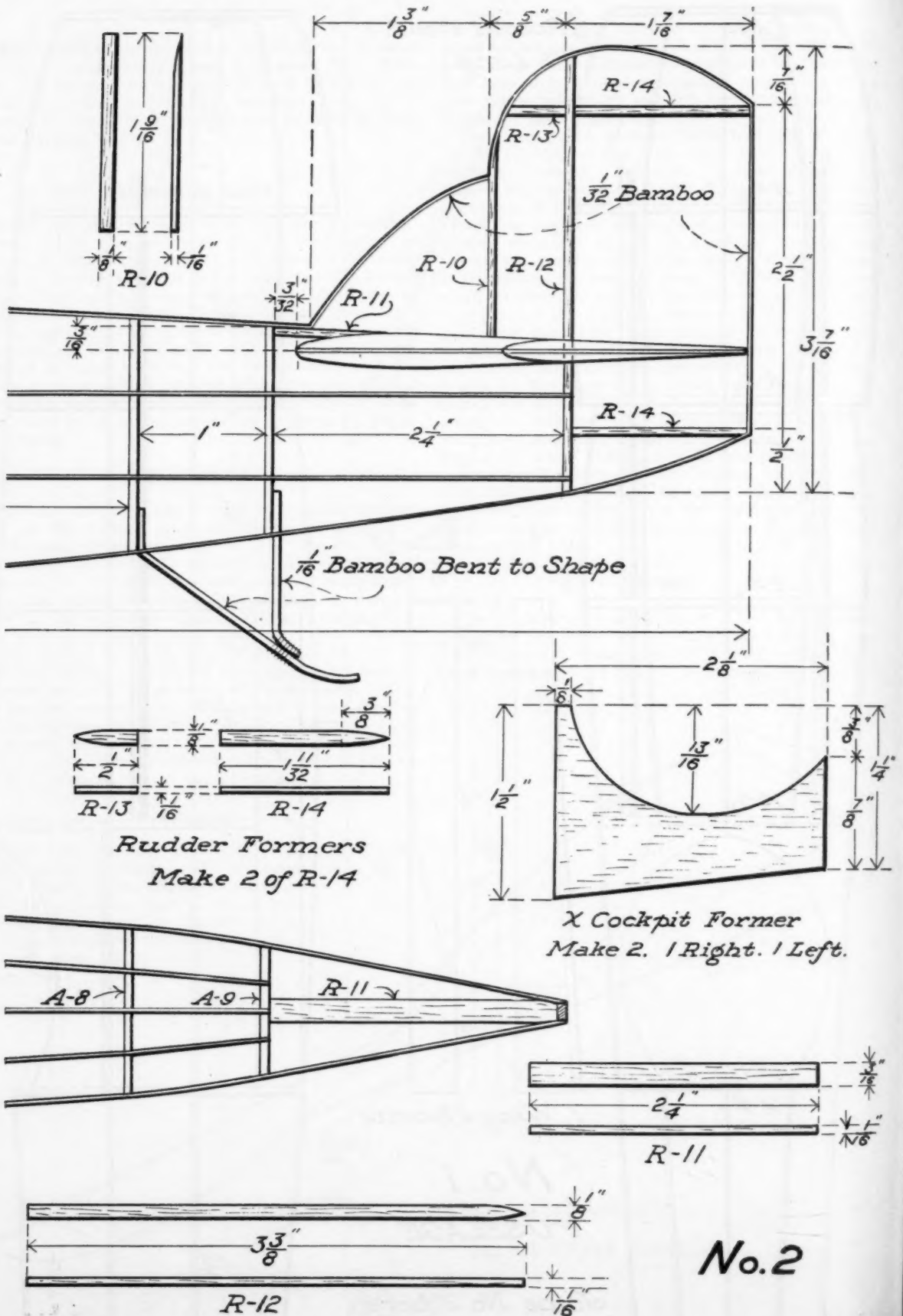
The "X" struts are made of  $1/8'' \times 1/8''$  balsa shaped as shown in drawing 9. The center section and aileron struts are made of  $1/8'' \times 3/16''$  balsa. Make two of each strut shown in (Continued on page 60)



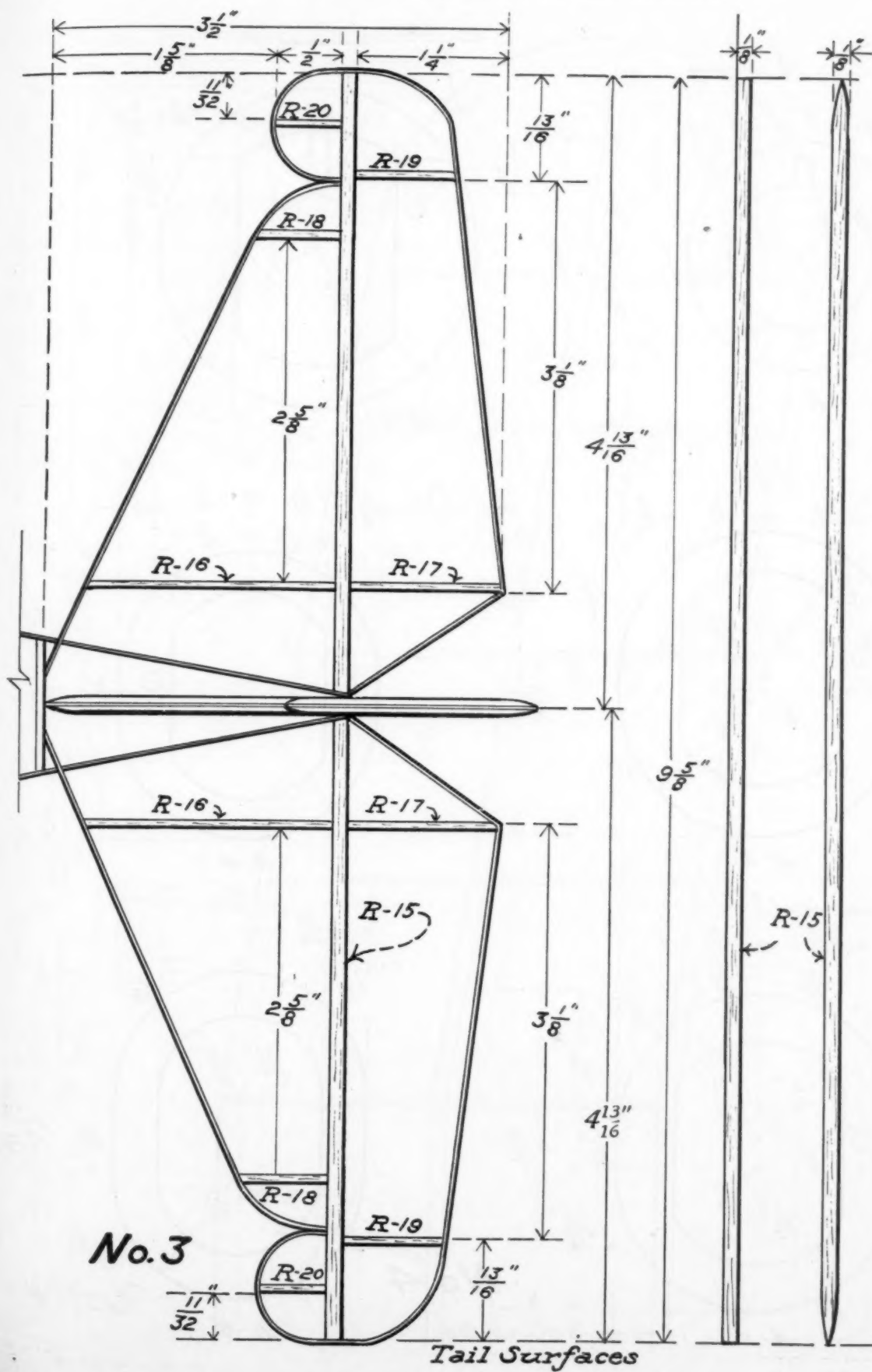




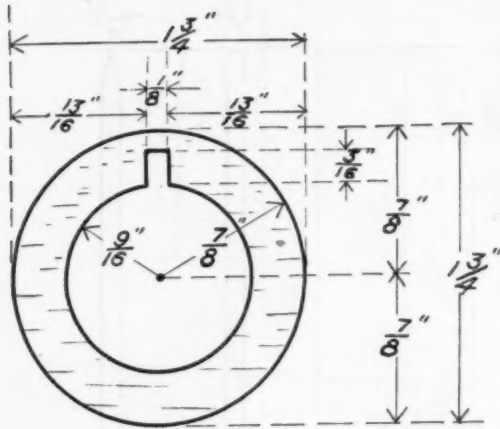




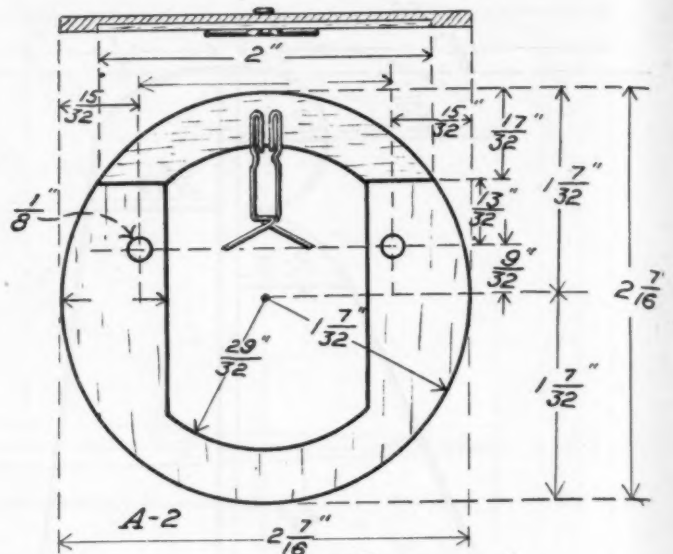




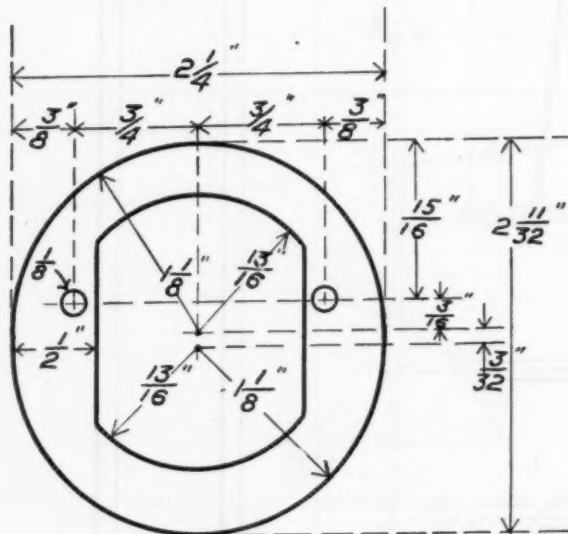




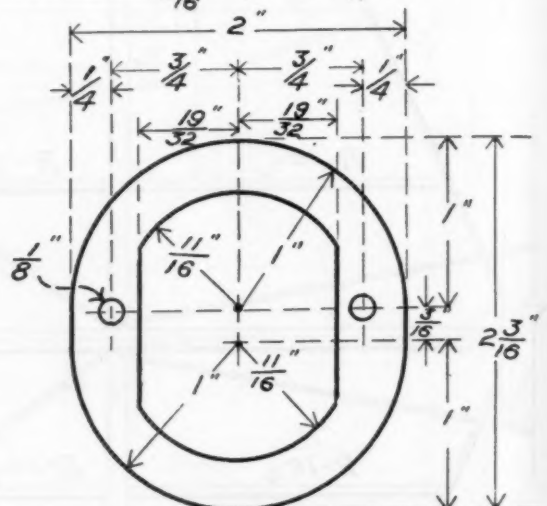
A-1



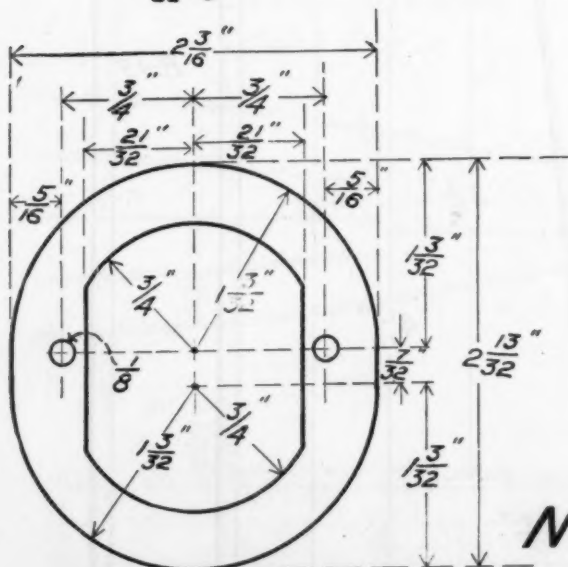
A-2



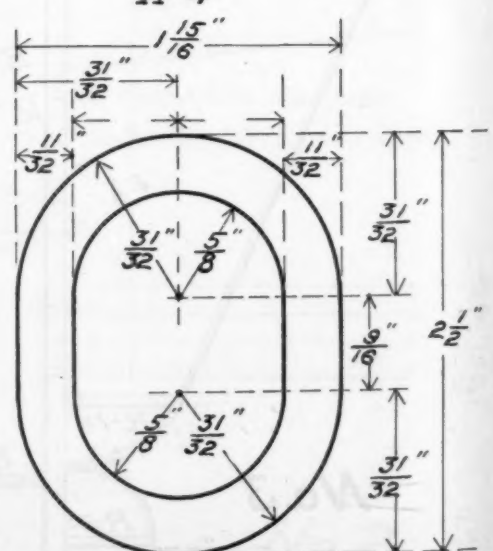
A-3



A-4



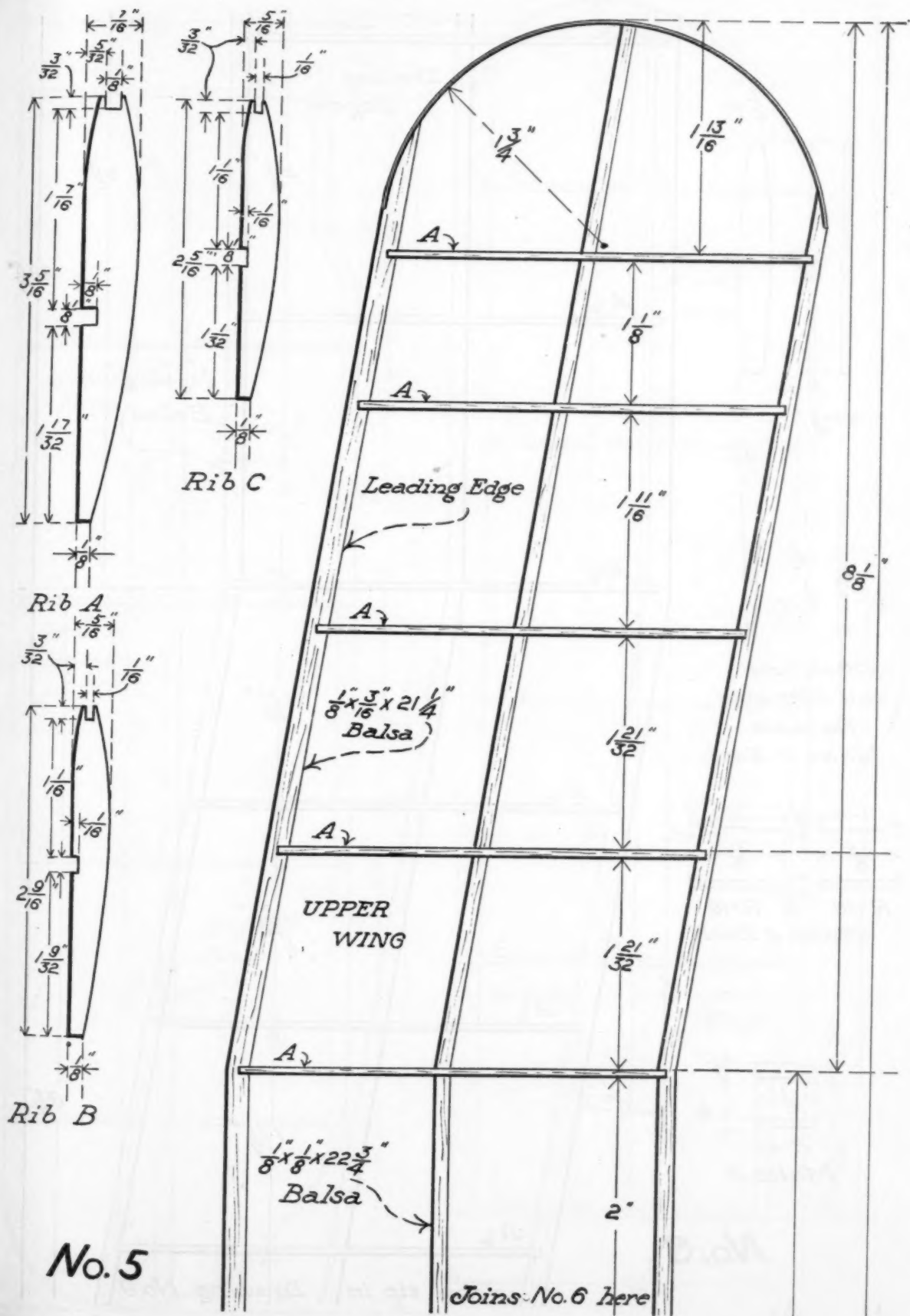
A-5



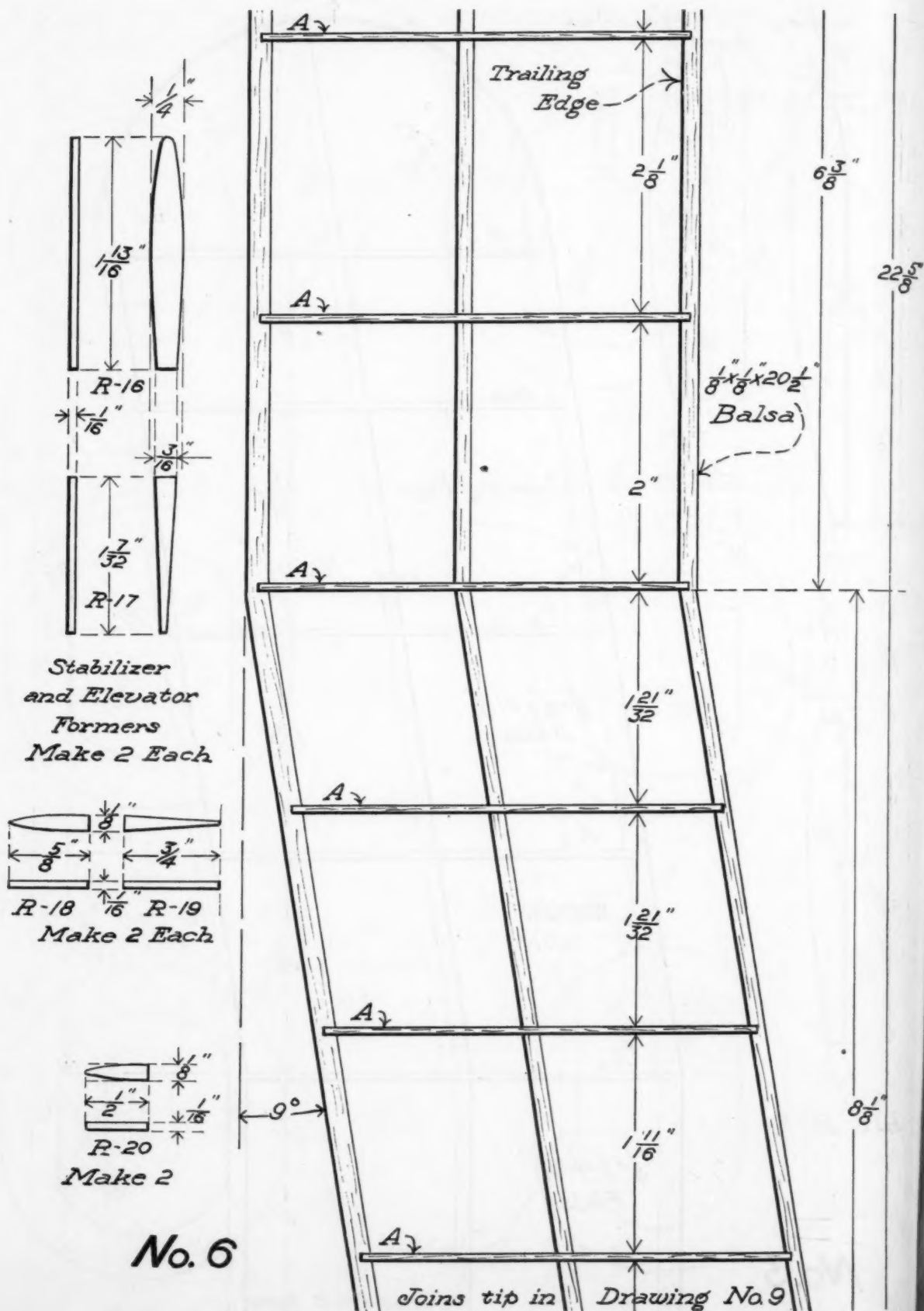
A-6

No. 4









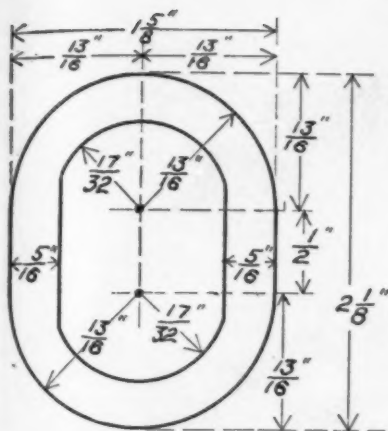




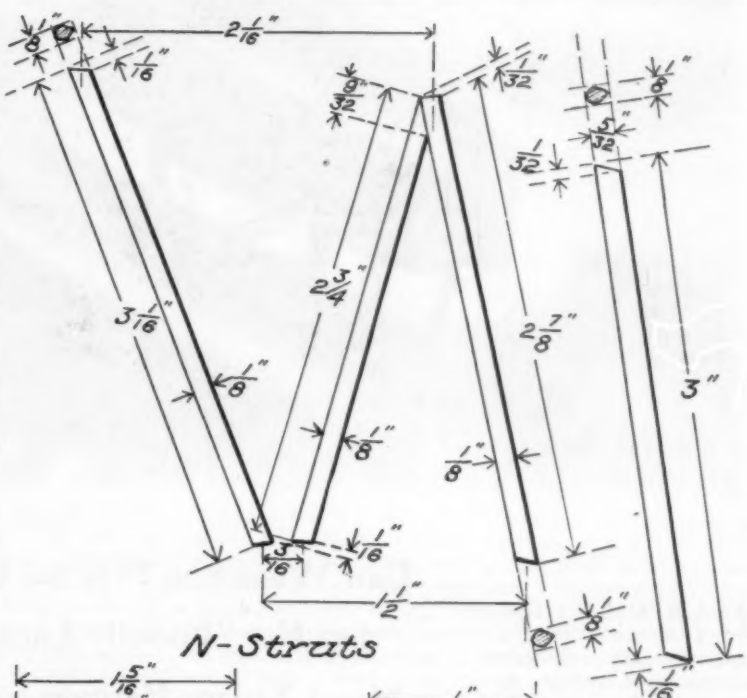
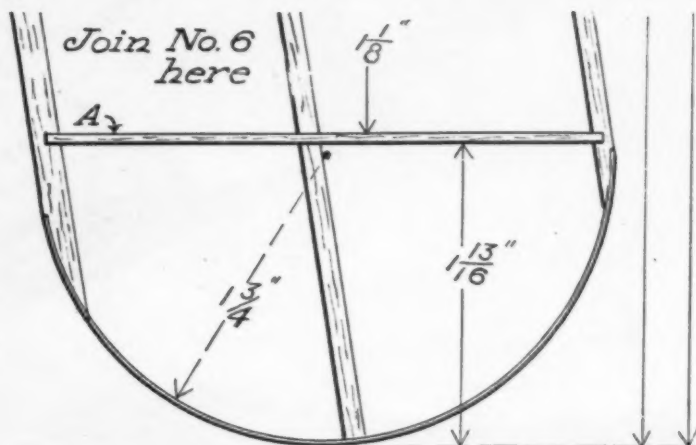
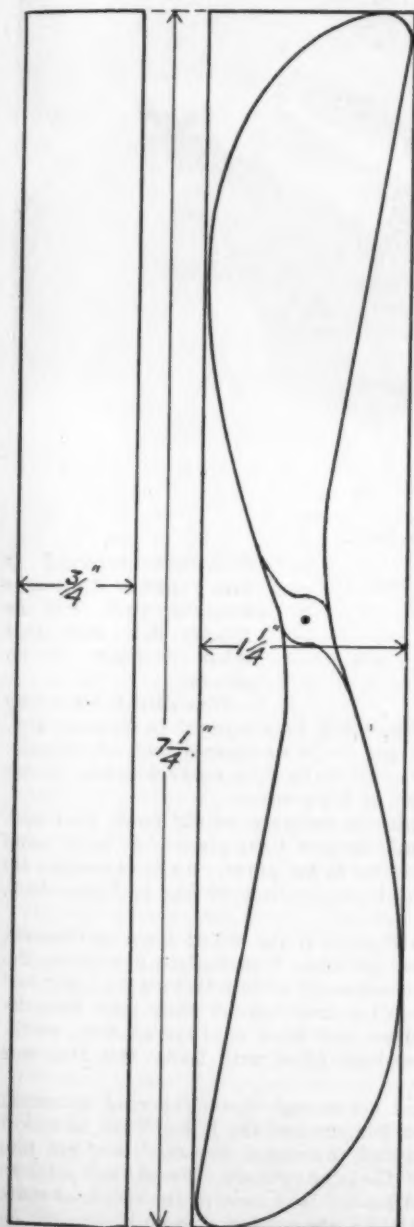




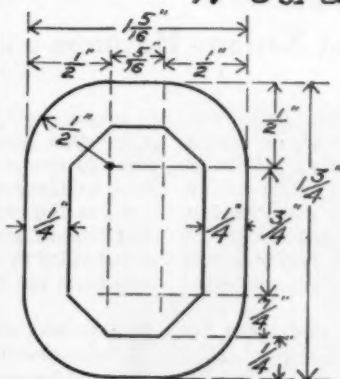




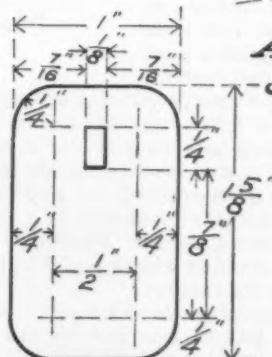
A-7



N-Struts



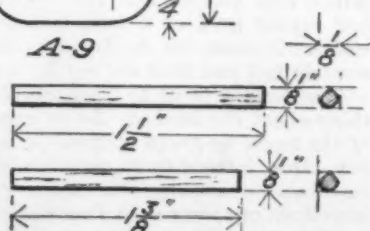
A-8



A-9

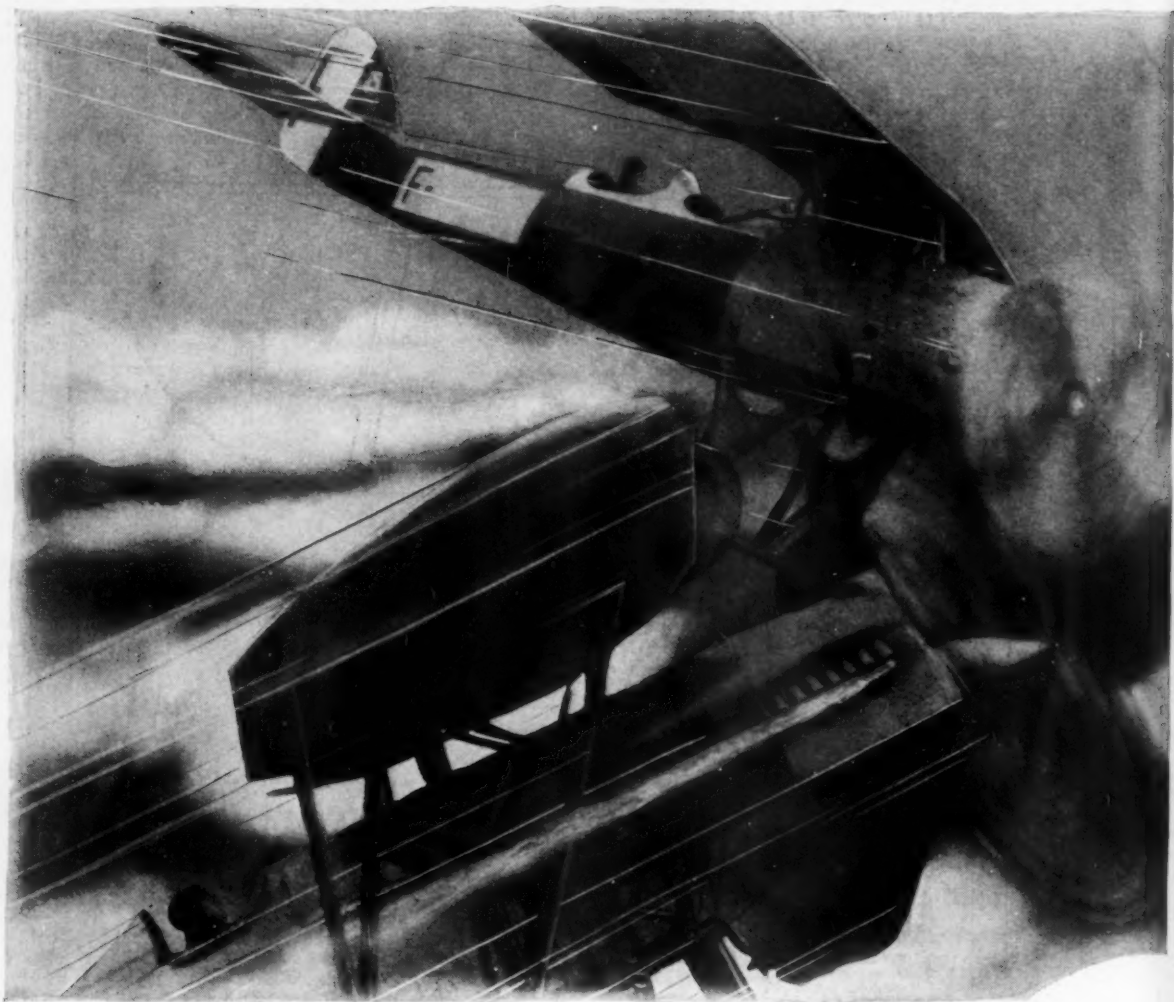
Aileron Struts

No. 9



Center Section Struts





## Dan Wanted to Play the Game but His "Friendly Enemy" Meant Serious Business . . . . .

**DAN CARTER** learned to fly against his father's wishes and, after he completed his course in aviation, secured a position as a stunt flyer for the Dawnart Films performing difficult feats in the air.

Receiving a letter from his father, "Dad", he sensed that something was wrong. He decided to return to Boomer Valley and try to help his father if he needed him. When Dan reached the valley, he discovered a herd of his father's longhorns in a secluded canyon in charge of some Mexicans. Dan knew his father would not employ Mexican riders and felt that here was the trouble. Cattle rustlers!

Dan continued on to the ranch house and there his father told him he was in financial difficulties. Dad had repaid part of a loan and the receipt had been stolen. Simons, the banker, was now demanding payment in full and Dad did not have the money!

Dan decided to go to town and try to find out something about the banker. As he came to the main street of the town, he found a crowd of men abusing a young boy. Dan jumped in to save him and after quick fight was knocked unconscious. He woke up the next morning in jail, in company with Tom Calloway, the boy he had tried to save. They were brought before the judge, who proved to be Simons, the banker, and Dan was fined

\$500 and returned to jail. Later Tom was brought back but he would not tell Dan what sentence he received.

Dan discovered a way to break out of jail but Tom refused to go with him. After Dan was out he hung around and saw Simons come to the jail and make Tom agree to blow up the bank as the price of his freedom.

When the explosion occurred at the bank, Dan realized that he would be in a tight place if he were found and decided to return to his plane. As he is making his way back, the townspeople discover him and give chase.

**I**T seemed to Dan as if the whole town of Crosscut was shooting at him. The bullets flew along the road he was supposed to be following as a hundred or more shouting men burned their guns into the night. If Dan had been on that road he would most likely have been filled with lead. But Dan was not there.

Dan went just far enough down the road to vanish from the view of Simons and the jailer. Then he darted to one side, crawled through a dry ditch and got into an open field at the edge of town. From that point he about faced and headed back toward the center of town.

While the rattling shots of the pursuit sounded on





The plane flashed in front  
and Dan braced himself  
for a crash!

By  
LAURENCE DONOVAN

## The Avenger from the Skies

the highway leading in the direction of his plane, Dan was traveling in the opposite direction. He did not want his plane to be discovered before he could take off. He had to think fast.

Having doubled back on his tracks, Dan wanted to lead his pursuers in the other direction. From the shadow of a building he saw a number of ponies tied to a rack near one of the speakeasies. No one was in sight. Farther down the street Dan could see a group of men assembled near the bank where the safe had been blown.

Dan waited a moment and, seeing no one in the street nearby, he darted across to where the ponies were tied. Slipping among them he untied the reins of half a dozen broncos. Swiftly mounting one of them, Dan got all of the horses away from the rack and headed along the street in the direction of the crowd near the bank.

Giving a loud "whoopie!", he slapped the nearest ponies with his hat, dug his heels into the ribs of the one he had mounted, and with a wild clatter of hoofs he rode straight toward the men beside the bank.

Dan was lying close to the pony's neck as the small stampede swept by the surprised townsmen. Too late someone realized what was happening. Then there rose shouts of, "There's the thief!" "Get him!" "He's stole the horses!" Some of the men began shooting wildly, but the only target they had was the bunch of galloping ponies.

Dan heard one of the broncs squeal as if

it had been hit. But all of the ponies kept going. He hoped the yelling and the shooting would attract the attention of the posse, mostly afoot, which was chasing his shadow out the other road. He knew there were other horses to be had and that it would be only a minute or two before another posse would be seeking to ride him down. But the time it would take to get other horses was what counted at this moment.

Dan clung to the running pony until he had passed the last light on the street. Then he pulled the bronc to a halt, slipped off, slapped the pony across the rump and sent him galloping after his runaway mates. Circling once more, Dan got back to town. He did not have long to wait. His trick had worked.

Shouting, the members of the first pursuing posse came pelting along to join the other men. Soon a score of riders were on their way, chasing the stampeded ponies. Dan





started across the fields in the direction of his plane. He knew he had at least three hours until daylight. He could take off with the plane in the darkness, but once in the air he would not be able to land before dawn, and he could not afford to waste gas.

Dan did not believe Simons would make any great effort to have him caught. So far as the crooked banker-mayor of Crosscut was concerned, all of this pursuit had been merely a bluff. Dan knew that. It had helped out Simons' trick of having his own bank robbed.

In the meantime where was Tom Calloway?

DAN felt sorry for the other boy. That he had been frightened into becoming Simons' tool in robbing the bank was apparent. Tom needed a friend, and Dan was determined that if he could find the other boy, he would do what he could to help him. Besides, if Dan was going to clear up the tangle into which Simons had got Dad, he would need Tom.

Faint sounds of shooting came from beyond the town. Perhaps by this time they had overtaken the runaway ponies and discovered that Dan had eluded them. But they would not know when Dan had slipped away.

It lacked a few minutes of two o'clock when Dan reached the "Eagle Longhorn" plane. It was just as he had left it. He was glad he had landed a half mile or more from the highway. If any of the townsmen were still searching along the road, they could not see the plane in the darkness.

Twice Dan heard voices, but the men did not leave the road. Shortly after three o'clock streaks of pale light appeared over the mountains to the east. The time had come to take off, before the rising sun revealed the presence of the plane. Dan worked feverishly piling up rocks around his landing wheels for blocks.

When he had everything set, he twisted the propeller to get compression, and then he gave the blade a sudden whirl. The motor caught. From the instant the first explosion of the engine sounded, Dan knew the presence of the plane would be known to anyone who might be within a mile or two on the road. He had to move quickly.

Dan scrambled past the wing and into the cockpit. Automatically he buckled the straps around him while he was advancing the throttle a notch at a time, revving the prop to warm the motor. His ears strained for any noise that would indicate he had been discovered.

"Hey! What the—"

The man's shout came from the direction of the road. Another voice answered.

Pop! Pop!

The cracking guns sounded faint in the thunder of the plane's motor as Dan gave the whirlwind the gun and felt his wheels lift off the improvised blocks. When the tail skid took the lift, he pulled the stick and roared into the air.

If any of the bullets fired at random came near him, Dan did not know it. In another few minutes the sun would have jumped up over the mountain range and then he could begin his hunt for the fleeing Tom Calloway.

Dan was circling at a little less than a thousand feet when he spotted a lone rider on a pinto pony. He hoped that the rider was Tom. He was about

twenty miles south of the town of Crosscut, and that was about the distance Tom could have covered after the bank was robbed.

Dan scanned the ground, seeking for a meadow or a smooth plateau where he might take a chance on landing. As his eyes swept the surrounding country, he started. He could see what the lone rider could not. A dust cloud was rising to the northward only two or three miles from the fugitive boy on the pinto.

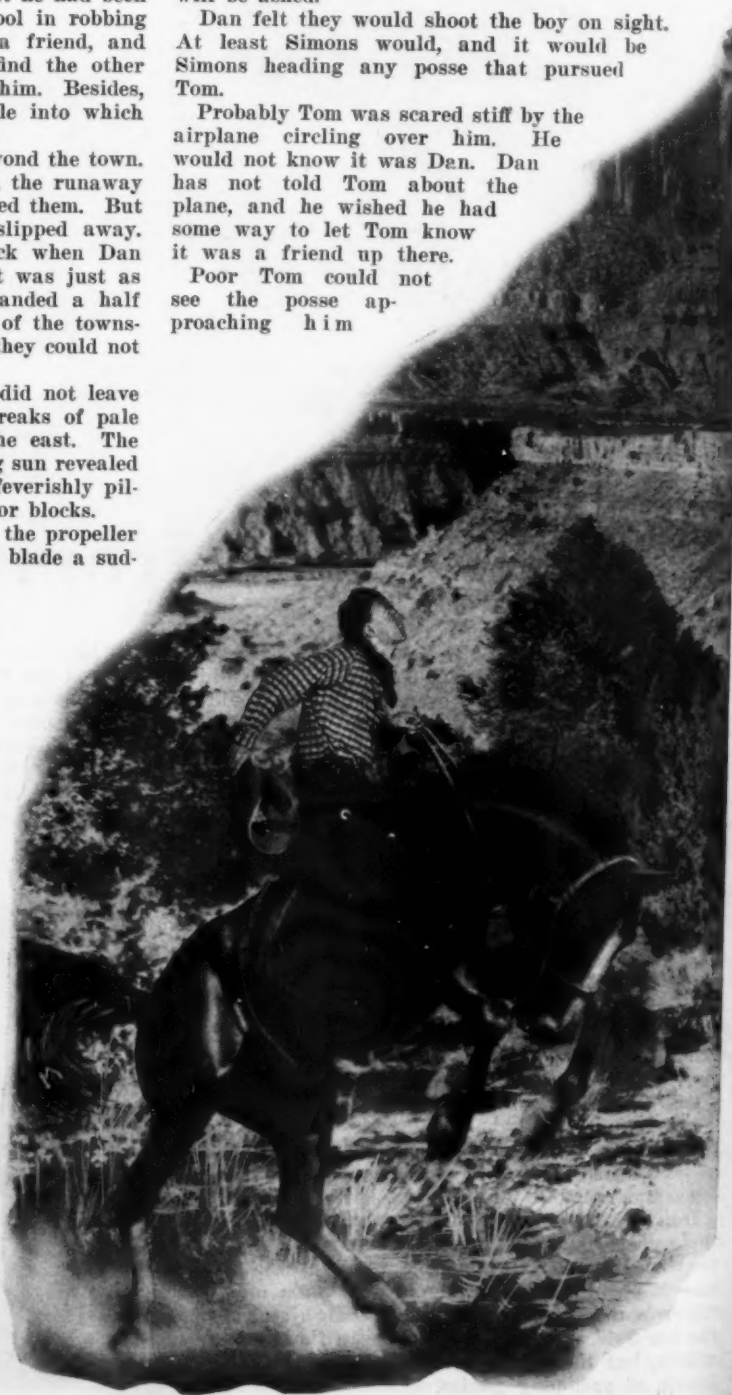
"That would be a Simons' trick," muttered Dan. "Have the poor kid rob the bank, then nail him cold." He recalled what Simons had told Tom.

"If you're caught within fifty miles no questions will be asked."

Dan felt they would shoot the boy on sight. At least Simons would, and it would be Simons heading any posse that pursued Tom.

Probably Tom was scared stiff by the airplane circling over him. He would not know it was Dan. Dan has not told Tom about the plane, and he wished he had some way to let Tom know it was a friend up there.

Poor Tom could not see the posse approaching him





beyond the ridge to the north. Dan had to do something. He pushed the stick forward, spiraling down. He volplaned down to 200 feet, then he banked and came back, and when he passed over the pinto he was flying at barely fifty feet above the ground.

The pony reared and bucked. Dan saw Tom's white face turned up. He waved and yelled and pointed to the northward. Probably Tom would not understand, but at this point there was no chance of landing. The trail Tom was following wound through a series of rough, rocky hummocks. A few miles to the south the trail entered the meadows, and the plane could be

merciless manhunt. Tom could not possibly escape by riding.

Dan straightened out at about 500 feet and held that altitude. There were a dozen men in the posse. They were less than a half mile from Tom and the pinto when they began shooting. Dan watched, and saw that Tom speeded up his pony. But evidently the pinto was tired, for the posse gained rapidly.

Dan saw, too, that Tom was not replying to the shots, and he judged that he was unarmed. Dan gritted his teeth. That would be like Simons, to shoot down an unarmed and defenseless boy. Dan wished mightily at that moment for a belt of cartridges for the shining Vickers gun on the nose of his plane. Even the dummy tracer bullets used in movie stunts probably would send Simons' cowardly posse scattering.

**B**UT the gun was unloaded. And Dan could not land here. He did not know what he could have done if there had been a landing spot available, but he would have got down and taken a chance.

The pinto was running now. Tom was bending low over the pony's neck. Dan was forced to keep circling to remain close by. He watched the posse draw closer. The townsmen's horses were gaining rapidly. Then Tom turned the pinto in the direction of the canyon creek bed.

Probably he had seen the break and thought he could get under cover. He had made half of the distance when the pinto went down. Dan groaned in sympathy. But Tom rolled clear, scrambled to his feet and started running toward the edge of the canyon only a hundred yards or so away.

The posse attempted to head him off, but their bullets still went wild and Dan saw Tom slip down into the loose rock above the steep drop to the canyon floor. If those rocks began to roll, Tom would be crushed at the foot of the canyon wall.

When Tom disappeared over the edge, the posse quit shooting. They rode as close as they dared to the canyon, then dismounted. But Tom had slipped into a crevasse somewhere. Dan could not see him. And when the posse reached the spot where he had gone over, the fugitive was not in sight.

At that moment Dan sighted the smooth, level place he had been seeking. It was a small plateau about half a mile back from the canyon. He could see the posse waving their hands and pointing. They seemed undecided what to do. Evidently they were worried about the plane, and Dan smiled grimly. At least Simons could not ride him down.

He wondered if Simons knew it was he in the plane. Probably he did and perhaps they had fired at him, too. If they had, none of the bullets had come close. Now the men were mounting their horses. They rode swiftly away along the side of the canyon. Dan saw their intention.

They would enter the canyon about two miles below. Then they could ride up and rout Tom from his hiding place. Dan thought Simons was a poor general, or he would have left a couple of men at the top. But all of the posse stayed together.

Dan pulled the stick and climbed over them, waiting until they had almost reached the place where they could descend into the canyon. Then he banked and glided for the landing spot he had picked out. When he got down, he left the motor idling and ran toward the canyon. If he could get Tom out of there, he would have to make a quick getaway.

At first, he did not see Tom, (Continued on page 53)



"They're after you!" Dan shouted to the rider below

brought down, but not here.

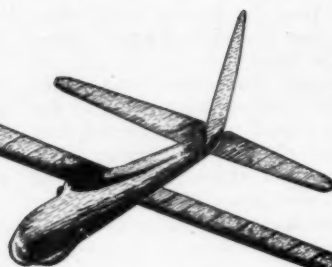
Off to the right about a mile Deep Creek canyon cut through the valley. The gulch of the creek had steep walls, with loose, sliding scabrock along the upper 200 feet, and then a straight drop of another 200 feet or more to the stony creek bed. If he kept on going southward, Tom would have to cross the creek three or four miles below where it entered the meadows.

Whether Tom recognized him or understood his warning, Dan did not know. But as he zoomed upward after signaling, Dan saw it made no difference. The pursuing posse had sighted the plane and the lone rider. Puffs of white smoke appeared among the oncoming horses, and Dan watched the beginning of a



By  
E. W.  
FRANKLIN

Valuable  
Information on the  
Development,  
As a Source of Great  
Fun, of



*Darmstadt Advanced Type*

## The Sport of Glider Flying

**A**FTER a boy has followed his hobby of model building for a year or two, mastering the building and flying of them, thereby learning many of the principles of real flying, and has learned the principle of control of real planes, we will suppose he reaches the age of sixteen or over, and has an intense desire to do some real flying. It will be some years before he is old enough to fly an airplane.

Here is where the glider fits in as the next logical step in his aeronautical education. Glider flying is considered safe provided the glider is an approved type and properly constructed, and the student has had the necessary preliminary instructions. It is wonderful preparation for airplane flying later. Many pilots hold the opinion that students of flying should always have this preliminary training.

Glider flying or sail flying as they sometimes term it has been developed to a high degree in Germany where attention was directed to this type of flying by the restrictions placed on the country by the Treaty of Versailles. They have established records of 14 hours sustained flight, 4,000 feet altitude and 93 miles for distance. There are now more than 200 glider clubs in Germany.

Most of the progress there has been made in the last six years and it is noteworthy that the only serious accidents that have occurred in that time have been dare-devil flights under extraordinary conditions such as storms, etc., or with freak machines.

Although glider flying is not new to this country, as the airplane was developed from a glider by

the Wright brothers, there has been comparatively little progress made up to the last two years. Much interest, however, has been aroused and now glider clubs have been organized in all parts of the United States. There is now a prize of \$2,000 offered by the officers of the National Glider Association for the first ten-hour glider flight under official observation to be made by an American citizen. An additional prize of \$100 per hour for each hour in excess of 10 hours up to a total of 20 hours is offered by Edward S. Evans, president of the National Glider Association. This makes a total of \$3,000 for the first twenty-hour flight.

**D**URING the National Air Races at Cleveland last summer, glider flights and contests were held daily throughout the meet. On September 1 and 2 last the Pacific Coast Glider Meet was held in San Diego, California.

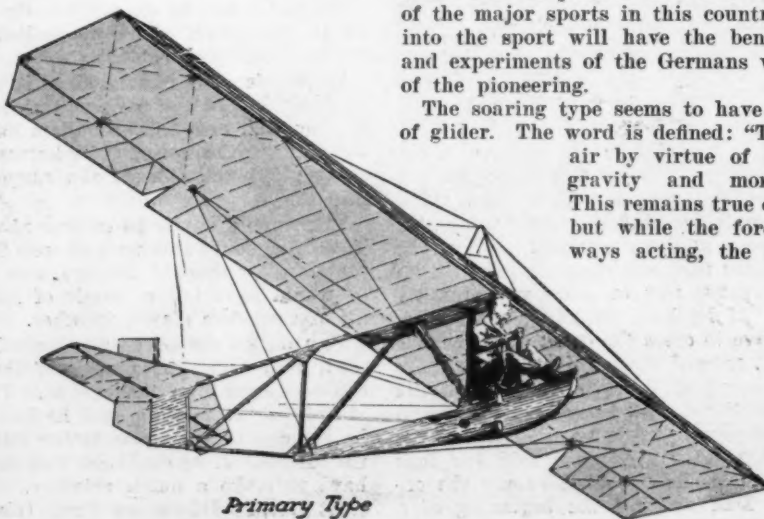
Glider schools are being organized in different parts of the country. There are a number of manufacturers producing finished gliders and also in a knocked-down form with instructions for assembling.

Viewing this rapid progress in so short a time it seems safe to predict that this will develop into one of the major sports in this country. America coming into the sport will have the benefit of the research and experiments of the Germans who have done most of the pioneering.

The soaring type seems to have surpassed the term of glider. The word is defined: "To move through the air by virtue of gravity, or, usually gravity and momentum; volplane." This remains true of the modern glider, but while the force of gravity is always acting, the utilizing of rapidly

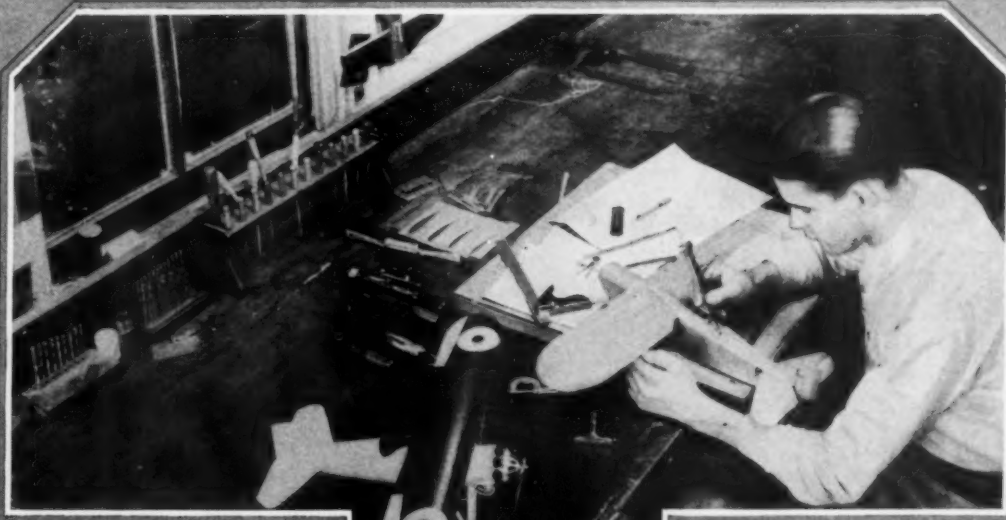
moving upward currents of air overcomes this downward pull and the plane rises. This action does not seem to be described adequately by the

(Continued on  
page 62)



*Primary Type*



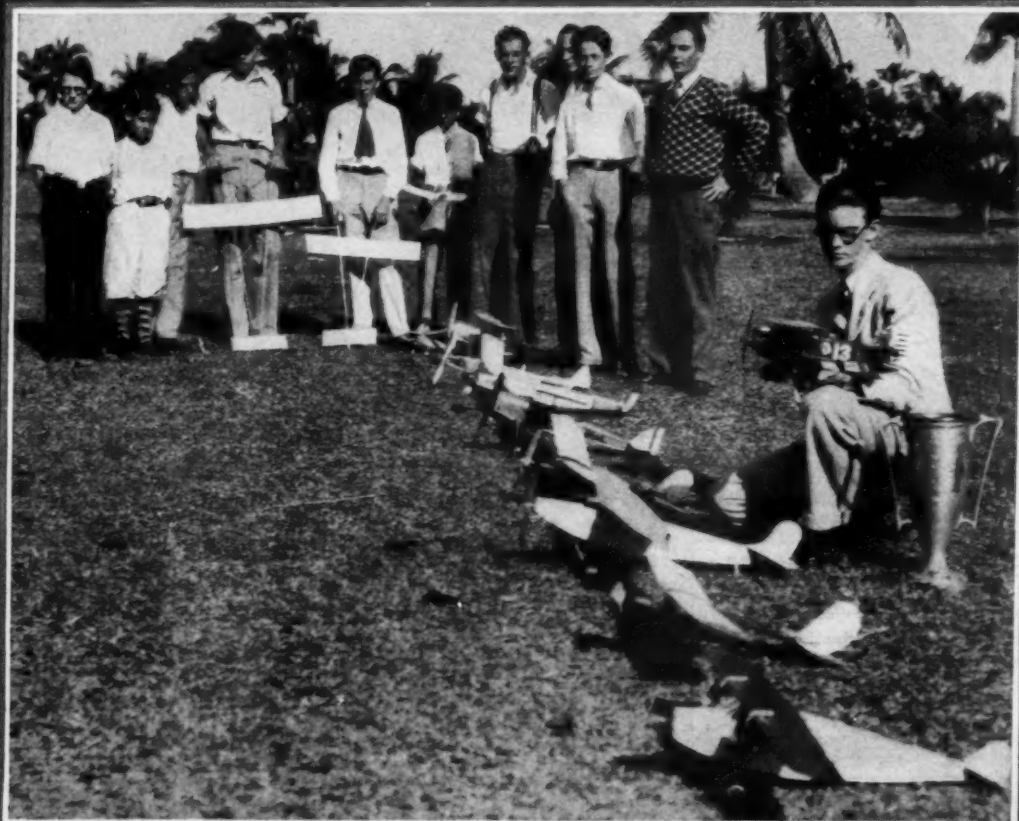


**BELOW** are seen a group of model airplane builders from Massachusetts. They are (left to right) Roy Perry, Jack Richardson, John Beach, Harry Johnson, John McMahon, Donal Brunton and Edward E. Slattery jr.

**OTHELLO DICKERT** (above), a winner of a national model plane contest two years ago, attracted the attention of the Boeing aircraft experts, and is now employed by them to make models of military and commercial planes. He is shown at work on a navy plane

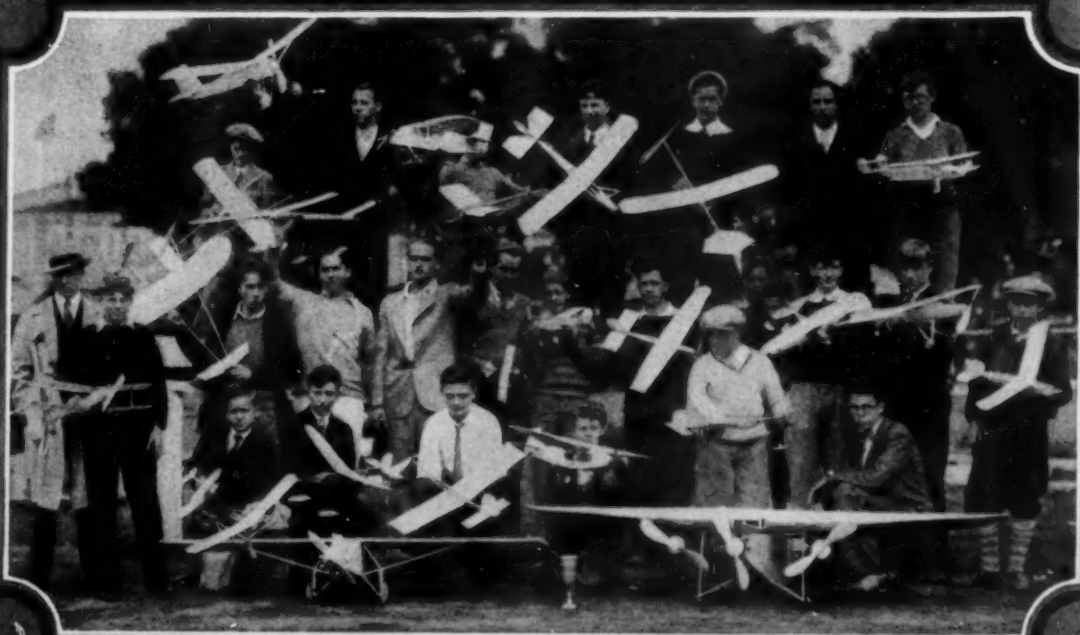






**BUDDING** aviators prepare for Model Airplane Meet at Miami! Photo above shows Lofton Dennis, 17, (right foreground) winner of last year's National Airplane Model Contest, with his followers there and their model planes. Some models can fly 1,500 feet

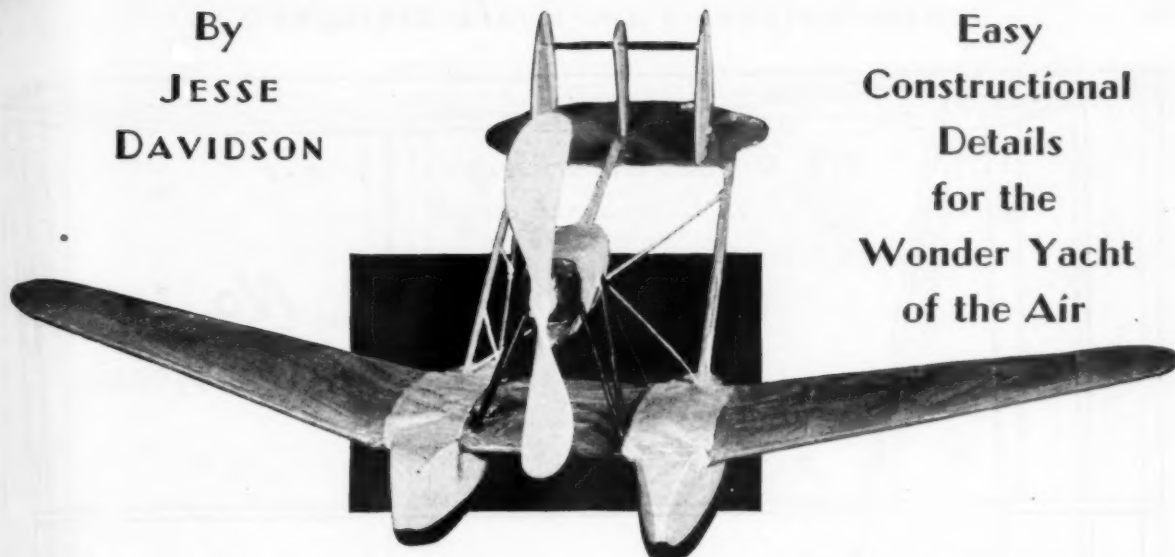
**AT THE** Fair at Brockton, Mass. Group of New England boys (below) who competed in the model airplane contest at the Fair. They are shown with their various models





By  
JESSE  
DAVIDSON

Easy  
Constructional  
Details  
for the  
Wonder Yacht  
of the Air



## How to Build a Savoia S-55 Flying Boat

**B**EFORE starting to work, see that you have before you the materials listed.

Begin with the hulls on the pontoons. From a 1/16" x 6" x 40" strip, make four patterns of the hulls. Cut them out with a sharp knife and sandpaper smoothly. Now you have two for each hull. Soak them in hot water for one-half hour. Meanwhile, split up your pieces of bamboo which are to be used for braces.

When the hulls have been thoroughly soaked, remove them from the water and see if they are fairly flexible. Now put them in the water. Bend easily to shape; two of them face left and two right.

At the foremost tip, get a piece of balsa 1/8" x 1/8" x 1" long and place the two hull sides to it. Fasten with pins and ambroid. Do the same on the other.

The hulls are built exactly alike; therefore, what is done to one hull applies to the other. Put the hull on one side to dry.

When dry measure 2-1/2" from the nose and place a piece of 1/8" x 1/4" balsa 2" long at the top and the bottom and ambroid.

Next ambroid two pieces of 1/8" x 1/4" x 1-3/8" balsa at the top and bottom 2-13/16" from the rear end. Ambroid a piece of 1/16" bamboo the entire length of the hull on the bottom and place cross pieces of 1/16" bamboo, as shown in drawing 5 to hold tissue in shape.

### Wings

Meanwhile, cut out from the strip of balsa the ribs for your wing and center sections. Use the 1/8" x 1/8" strip for your leading edge. Now cut the strip 1/8" x 1/4" to size for your center spar and use bamboo for the trailing edge. Make both wings strong and place the ribs upright. The first rib at each wing is set at an angle to lean towards the tip of the wing, the top of the rib being 1/4" from the vertical. Ambroid the ribs

into position and set aside to dry, after which process shave center spar off even with bottoms of ribs at the tips and round up the wing tips with 1/16" bamboo. Ambroid securely and your wings are done.

### Center Section

All the ribs in the center section are the same size as the first rib in your wing.

Use 1/8" x 1/8" for your leading edge, 1/8" x 1/4" for the center spar and bamboo 1/6" thick for the trailing edge. Set the center section away to dry.

After both the wing and center section are dried, cover them with Japanese tissue and use banana oil for gluing. Make sure that the surfaces are thoroughly dry and stiff before doping.

Ambroid the wing to the center section. The dihedral will be 2". Put props to hold the wings up while drying.

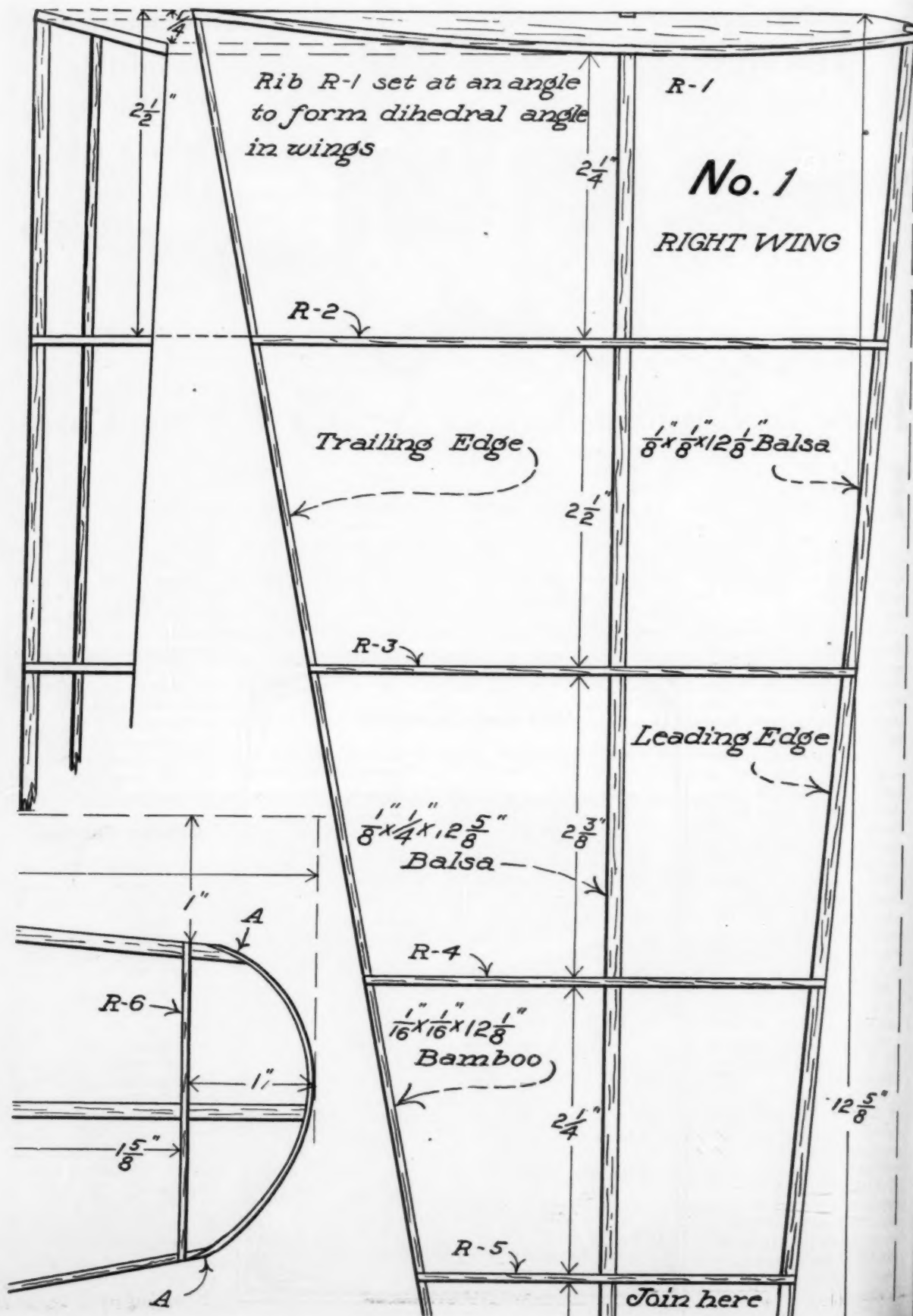
(Continued on page 59)

### Necessary Materials

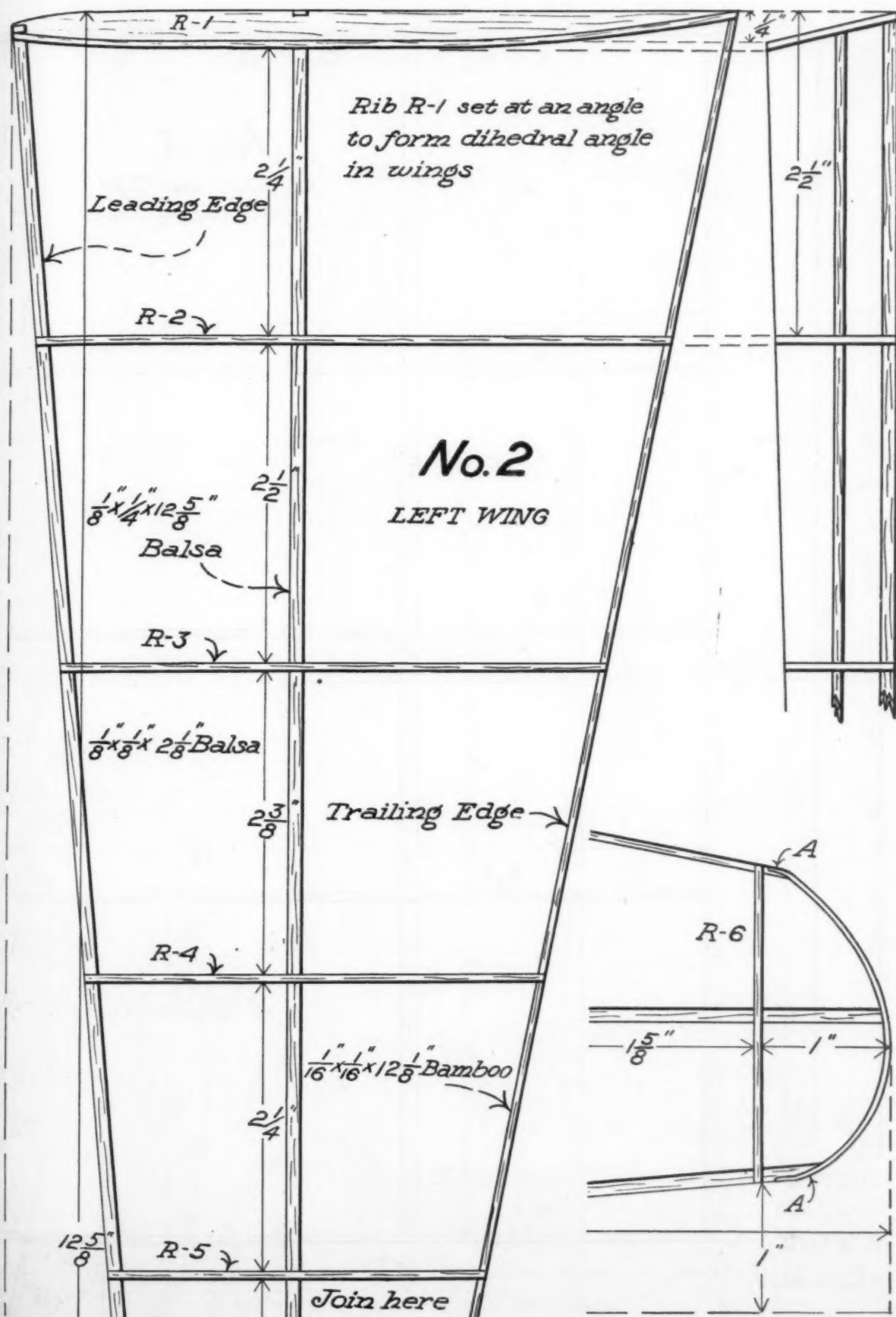
1 piece	1/16" x 6" x 40"	balsa for hulls, ribs, motor, formers, etc.
3 strips	1/8" x 1/4" x 36"	bamboo
1 strip	1/8" x 1/4" x 15"	bamboo
1 strip	1/8" x 1/8" x 36"	bamboo
1 strip	1/8" x 1/8" x 12"	bamboo
1 strip	1/8" x 1/8" x 12"	bamboo
2 feet	.006	wire
1 foot	.014	wire
3 copper		washers
1 large		thrust bearing
1	two ounce bottle	ambroid
1	one ounce bottle	dope
1	two ounce bottle	pontoon finisher
1	two ounce bottle	dope
1 block	1-1/2" x 3/4" x 10-1/4"	pine or spruce propeller
3 sheets		Japanese tissue
1 package		model making pins
20 feet	1/8" flat	rubber

Plans on Pages 26 to 33

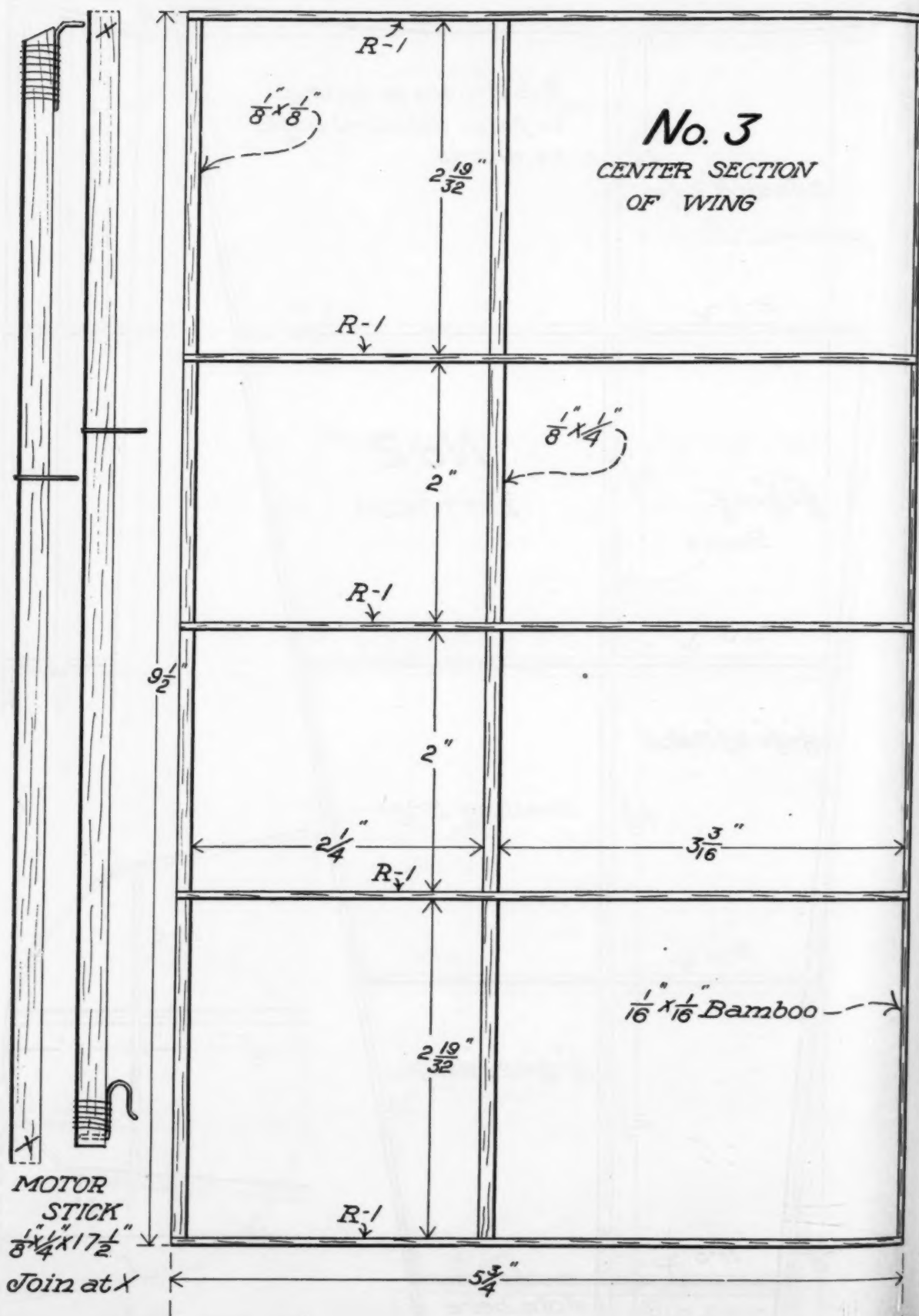






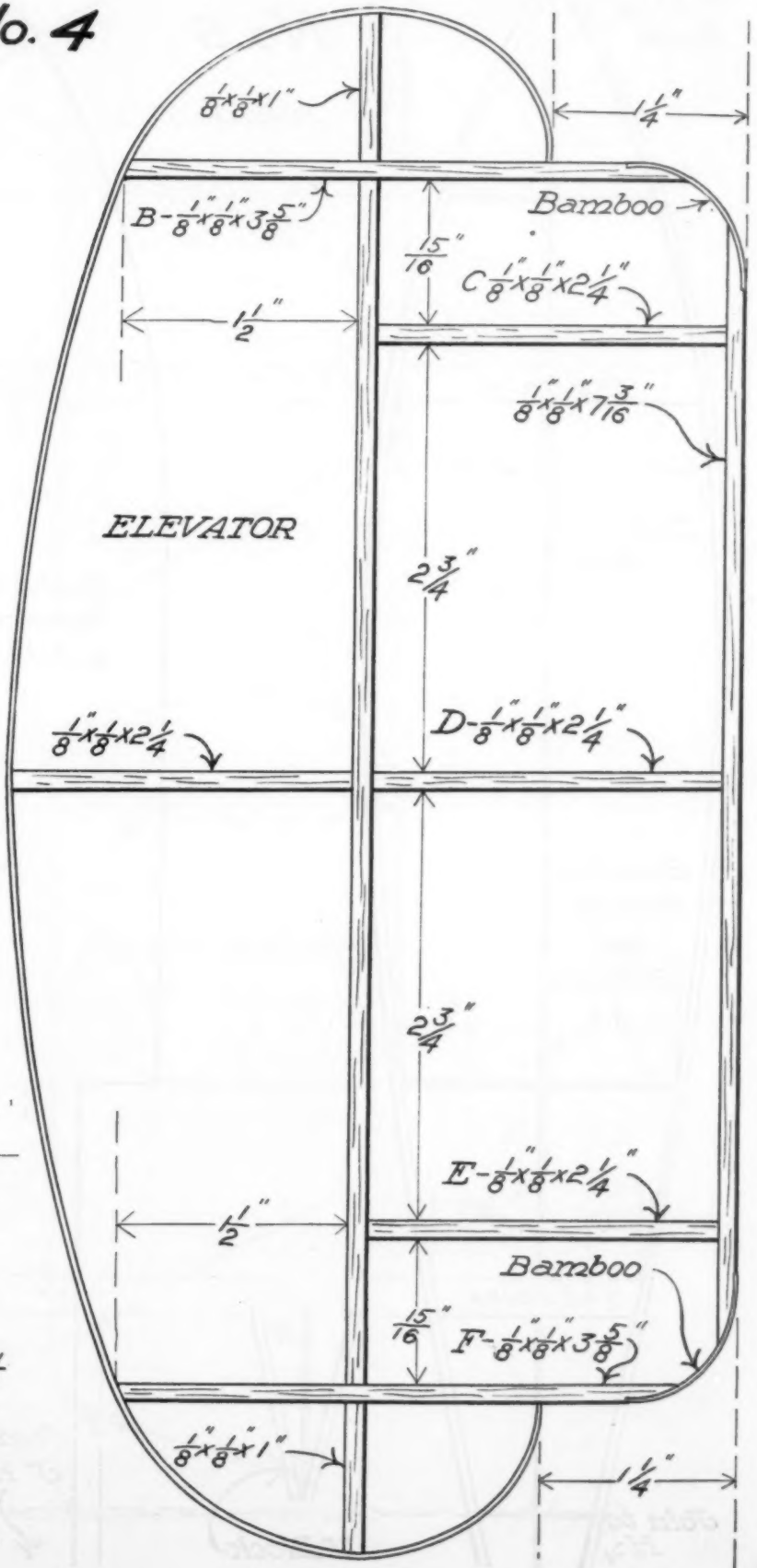
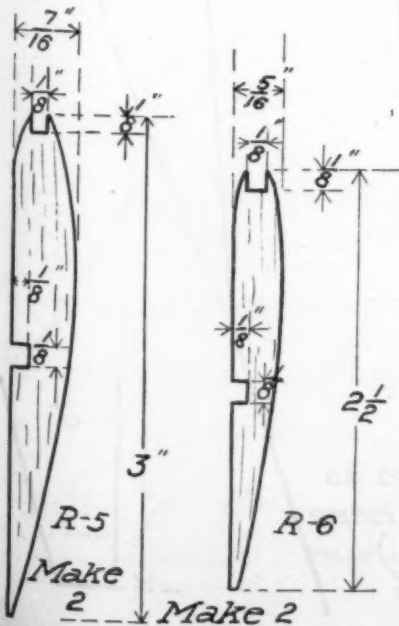
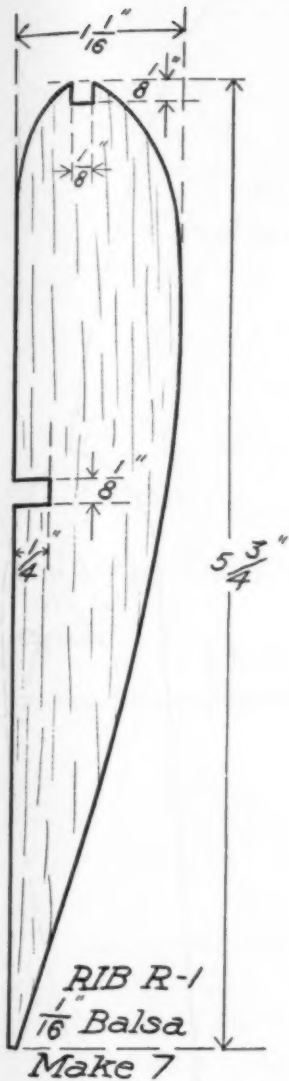




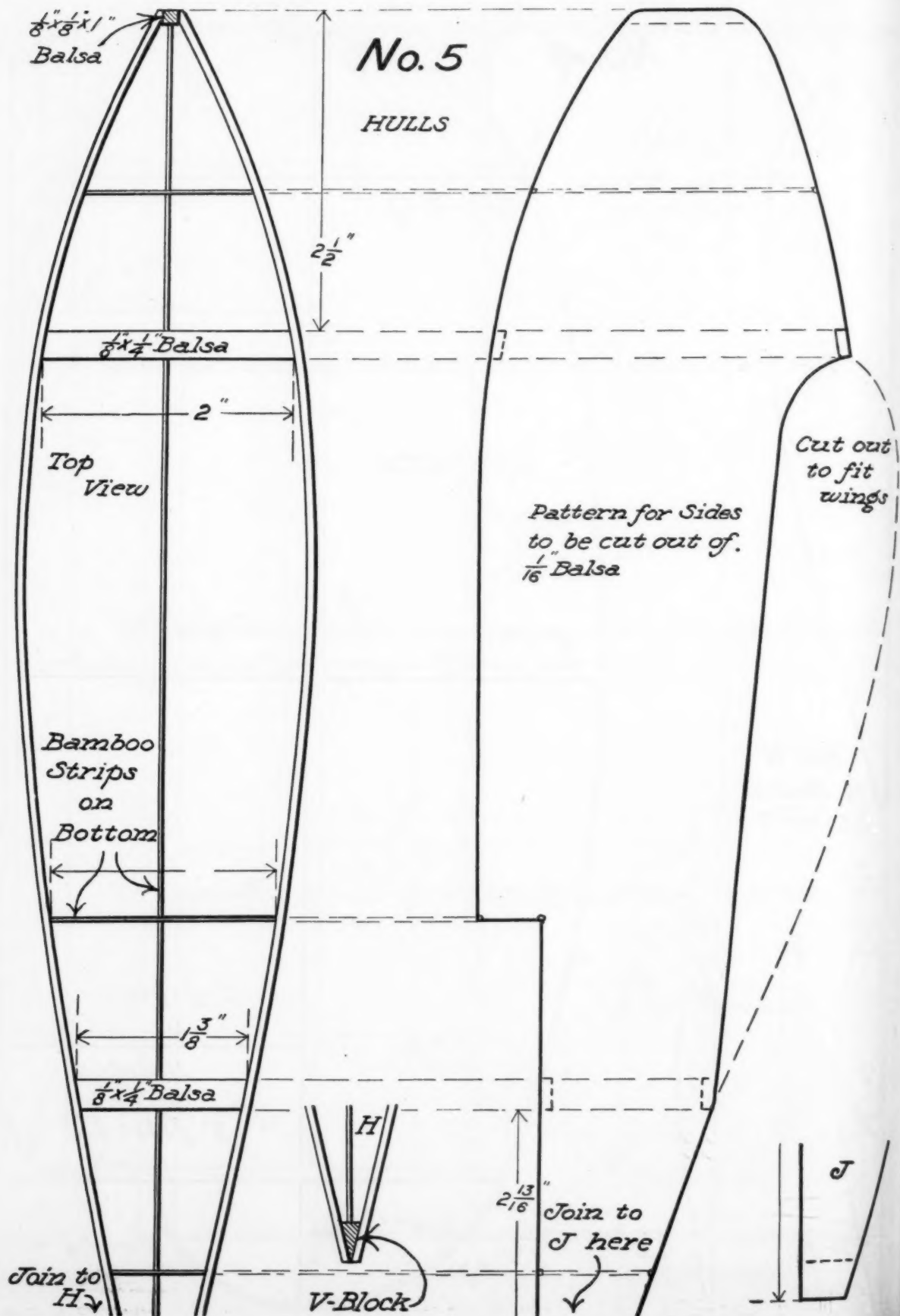




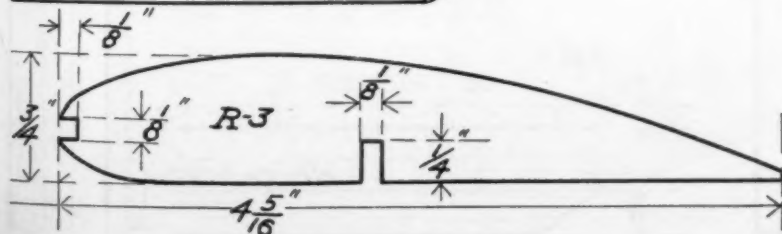
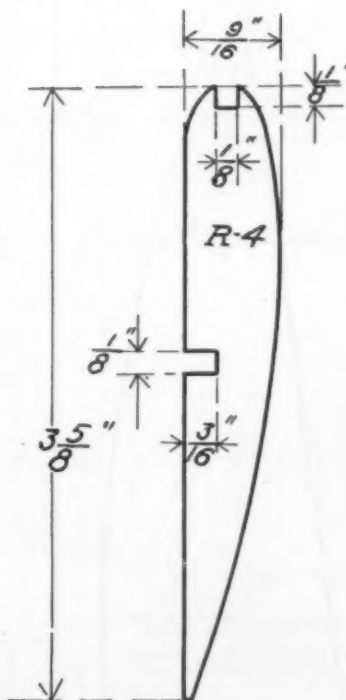
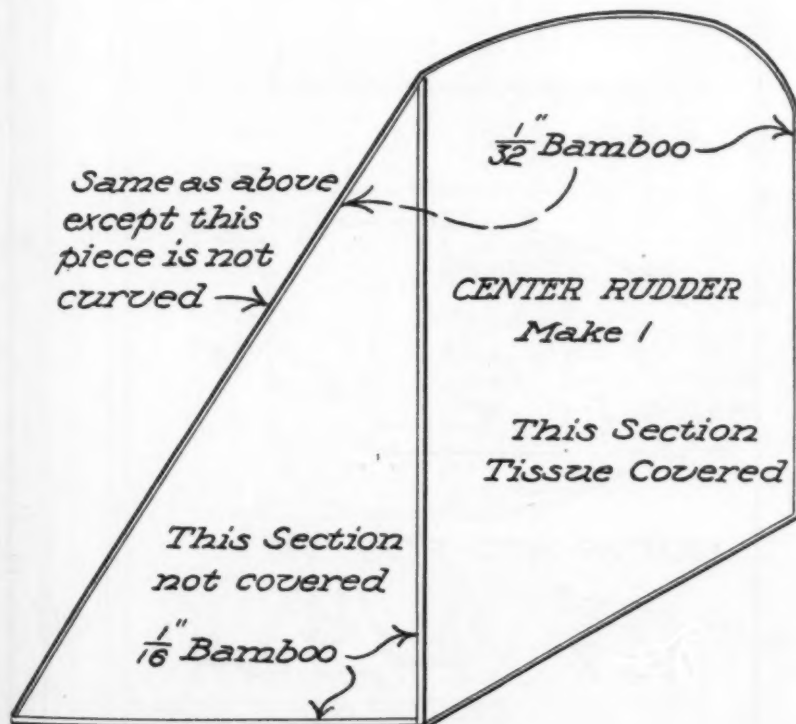
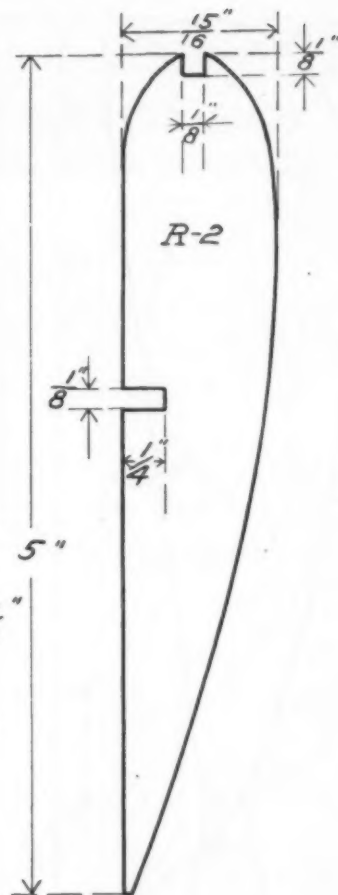
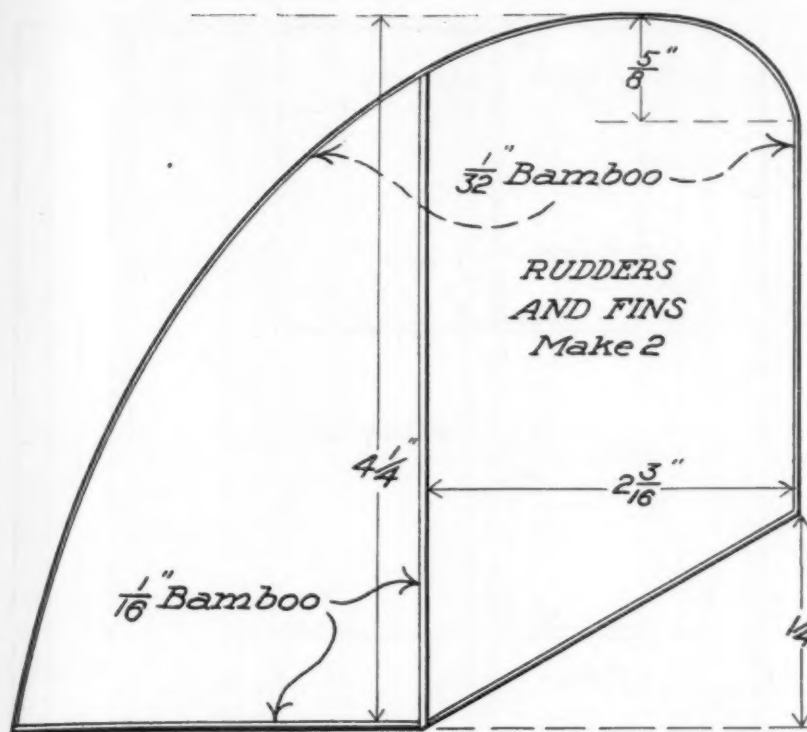
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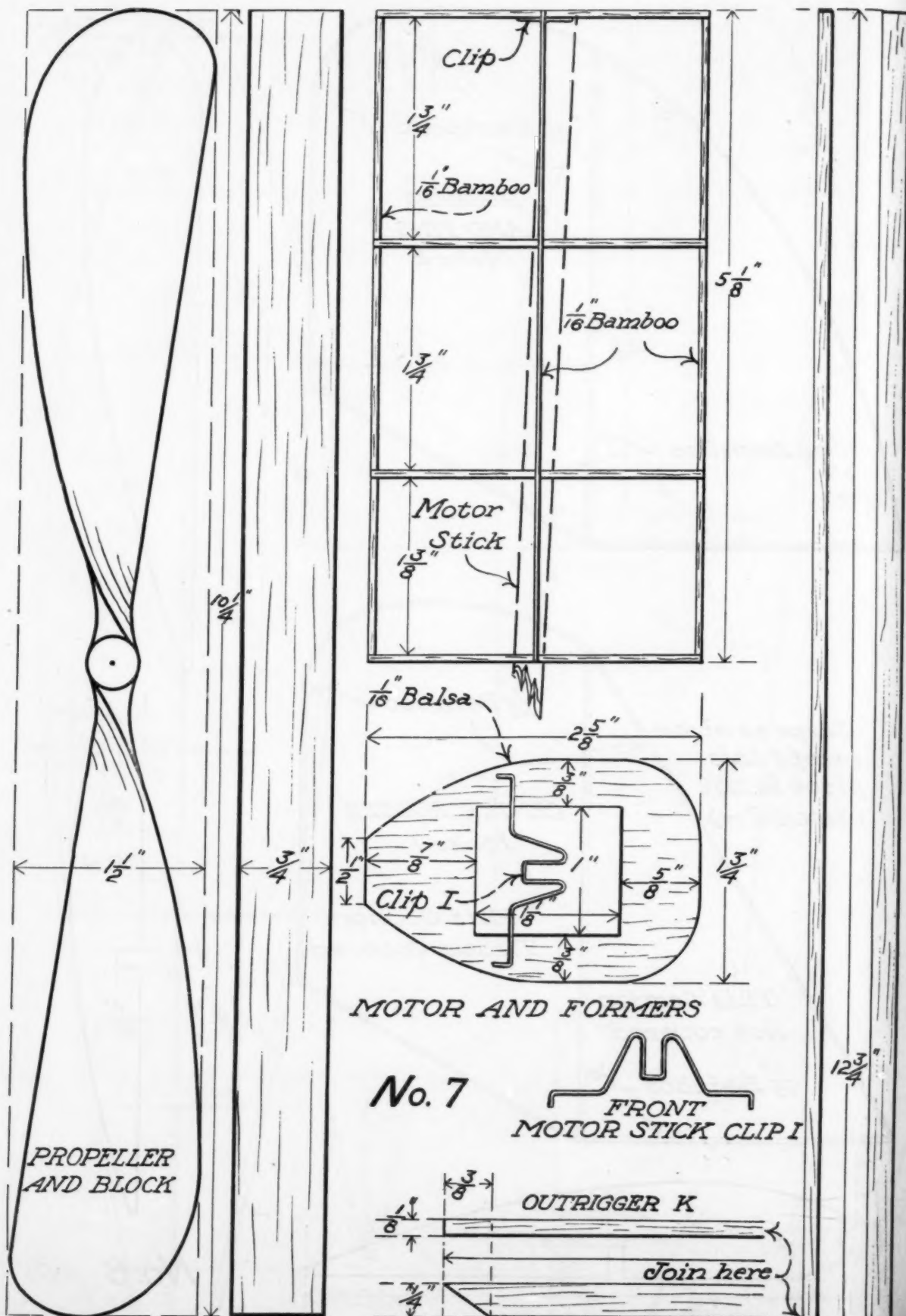




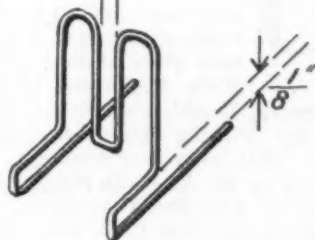
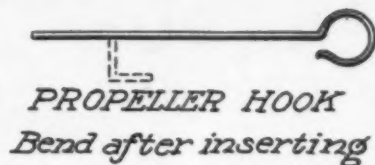
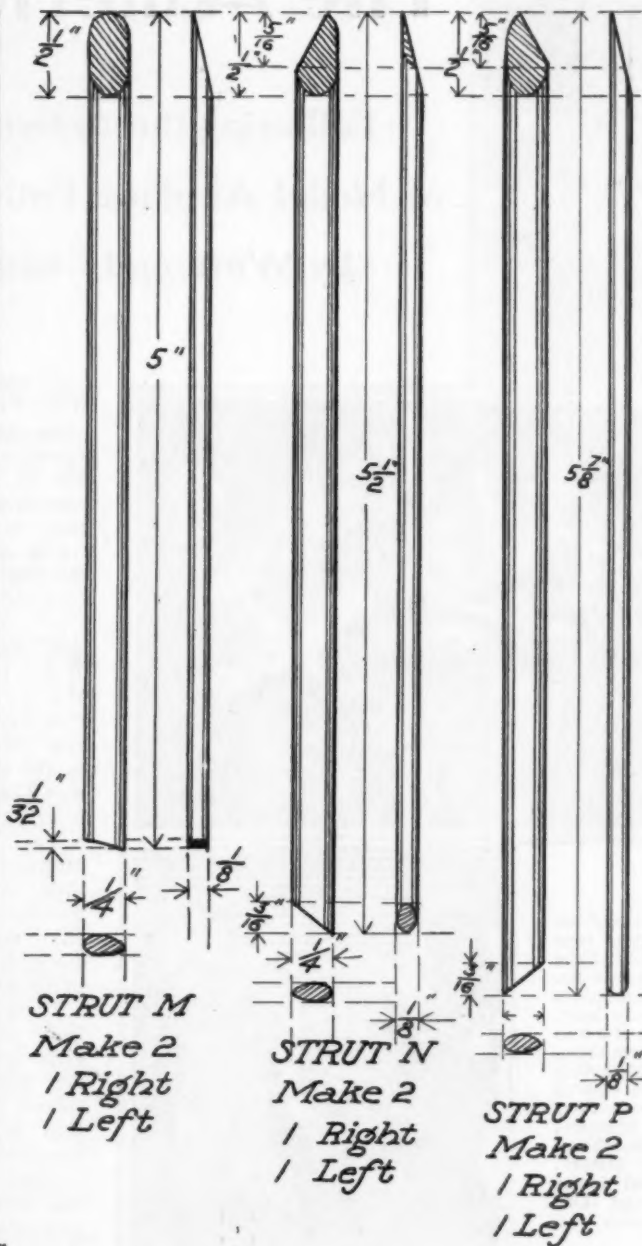


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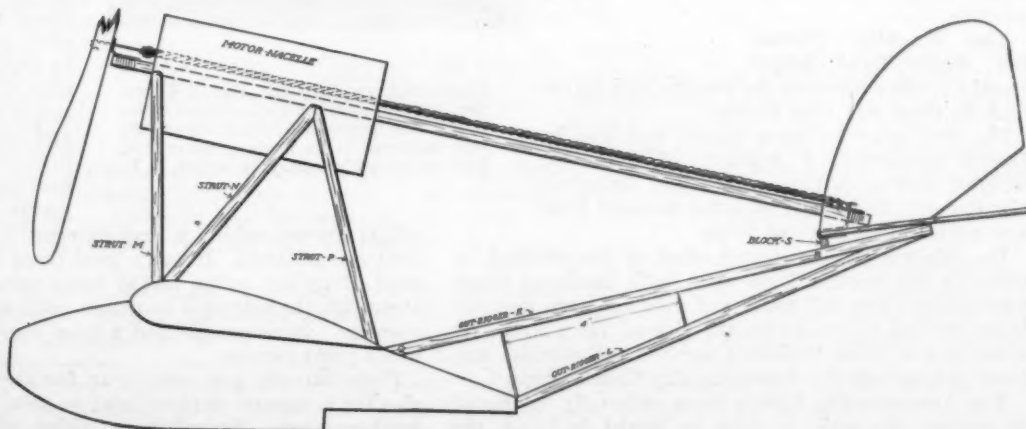




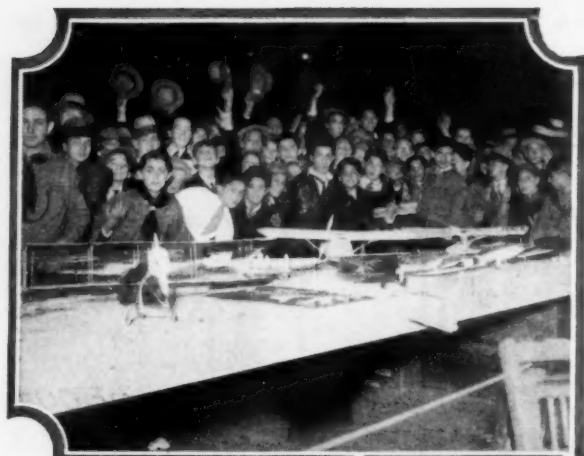


*Slightly Enlarged*

**No 8**







A display of model airplanes such as these is rarely seen anywhere. They were made by members of the American Sky Cadets and the Evening Graphic Junior Aviation Club and were put up for show at the rally held recently at the 106th Armory, Brooklyn, N. Y.

**O**NE of the most interesting indoor meets of the year took place at the 106th Regimental Armory, Brooklyn, on Saturday evening December 14. This rally was sponsored by the American Sky Cadets and the Graphic Junior Aviation Club, organized by the *Evening Graphic* in New York City.

How great an interest was shown in this rally can be gauged from the fact that more than 6,000 people were present. Prizes were given by the American Sky Cadets, consisting of two silver cups and a gold medal, while the prizes offered by the *Evening Graphic* consisted of a complete aviation uniform, cups and wrist watches.

The Brooklyn Council Boy Scout Band helped greatly to the success of the evening and we extend to them our best thanks.

The first prize for scale models was won by Joseph Rothstein, a member of both the Graphic Junior Aviation Club and American Sky Cadets. His model of a Tri-Motored Ford was an excellent piece of work.

He obtained the corrugated effect of the original by covering the wooden framework with corduroy doped with silver. The tail units and ailerons were movable being worked by levers on the side of the plane. By winning first prize Rothstein received the aviation uniform and one of the American Sky Cadets' cups.

The American Sky Cadets being especially interested in getting the girls to take up model building, the special gold medal was offered to the girl making the



The Metropolitan Aero Club of New York is one of the most active in the city. The members frequently hold some sort of a contest between themselves! Here they are above (left to right—front row) Virgilio Sturiale, Irving Goldberg, William Miller. (Back row) Irving Baker and Dan Pagano



Henry Behrens (left) and Harold Cohen (both above) were the two representatives of the Boy Scouts of America Aero Club, who competed in the finals of the contest held at the 106th Armory, Brooklyn, N. Y.

# The American

## Following the Activities of Model Airplane Enthusiasts by Word and Picture

best time with the B.M. Tractor. This prize was won by Florence Cafcaden of 229 E. 46th Street, New York City, in the time of 48 seconds, which also gave her the fifth prize in the contest.

**I**N the "Free-For-Ail" contest Arthur Boland of the Graphic Junior Aviation Club won easily in the time of 4 minutes 32 seconds with a Mott pusher. In this contest also Pauline Heyman of Pleasantville, N. J. and a member of the Graphic Club made a record for girls with a flight of 3 minutes 3 seconds.

There is one thing that all boys and girls should remember when attending indoor meets, and that is, that every movement causes a current of air which may affect the flight of a plane and cause it to crash. Move about as little as possible and if a plane in flight should come near you keep quite still and don't try to run out of its way.

It was extremely gratifying to see so many parents and

adults present taking a keen interest in the doings of the boys and girls. It was a good thing the parents did come along for owing to the large number of entries, about 520, the rally did not finish until 12:15 on Sunday morning. However, all had a good time and the rally was a great success.

Plans already are under way for another rally and also for a monster outdoor meet as soon as the weather brightens up. Meanwhile activities within the club are going ahead apace.



# Sky Cadets

## Full Report of Brooklyn and West Virginia Meets and Other Plane Contests

### Summit Junior High School, Summit, N. J., Club Report

During the month of September three flights were formed under the leadership of Mr. E. F. Furth, the Manual Training Instructor. These flights were formed in the 9th, 8th and 7th grades taking the following names and insignia, Black Hawk, Question Mark and Shooting Star.

A booklet entitled "It is Easy to Fly" published by an oil company has been of great assistance in helping the members to familiarize themselves with the different parts and functions of the plane as also with the several types of engines, lubrication, fuel, etc.

The members have built both flying and scale models. A feature of the club are the discussions that take place under the able leadership of Mr. Furth. A study is being made of the development of aviation and new ideas are being discussed. The spectacular side of flying is not being stressed, but emphasis is being placed on the benefits arrived at by famous flights.

Working on these lines studies have been made of Colonel Lindbergh's Atlantic and Central American flights as also of Rear Admiral Byrd's North and South Pole expeditions.

In this way a truer idea is obtained of the real reasons which lie behind these great deeds and the benefits that are obtained through them for aviation.



A group (above) from the Hebrew National Orphan Home Club of the American Sky Cadets, who participated in the rally



An interesting team (above) at the rally was Isaac and Margaret McKillop, brother and sister, of New York. They are members of the Oak Aero Club

### Morristown, N. J., Y. M. C. A.

The American Sky Cadets Club recently formed in the Boys' Department, meets for regular classes every Tuesday afternoon with model construction and the principles of flight as the main items on the program.

There are two flights in the club and competition is keen between them for supremacy in the air. Instructions in the building of scale and racing model planes is given by J. B. Leisner, a local air enthusiast, elected by the boys as leader. Under his direction great progress is being made in the study of model building. Each Cadet is working on a model of his own, which will be entered in the contest next spring.

—o—

Members of the Model Aero Cadets club shown above are (left to right, front row) Philip Dietrich, Edward Russwein, John Sendlein; (back row) Charles Russwein, William Russwein and Ellois Stern

Stewart Lyon, one of the flying commanders won second place in the contest held by the American Sky Cadets in Elizabeth, N. J. on October 26th. The following week Mr. E. J. Moriarty, Assistant Administrator, American Sky Cadets, attended a meeting of the club to present a medal to Stewart.

—o—

The Y. M. C. A. of Hamilton, Ohio has organized an American Sky Cadet Club.

Mr. Jesse Jones, Boys' Director writes to say that the club is going fine and the membership is increasing every week.

Herbert Piker, member of the club has done excellent work in obtaining members. A membership contest is on now, and a lot of fun is expected to develop in this contest.



The Y. M. C. A. at 52nd and Sanson Streets, Philadelphia, now has a group of American Sky Cadets.

Huntsville, Ala., Y. M. C. A. has just started their group of American Sky Cadets, and hope to have a School of Instructions, taught by one of the boys and have a contest running over a period of time with prizes offered to the boys making the best plane.

### West Virginia Contest

Robert Cunningham of 312 Vermont Avenue, Clarksburg, W. Va., a member of the F. B. W. Model Aviation Club of that town, sends a cutting of a contest that was held in the West Virginia University Field House at Morgantown. Four hundred were present.

In the fifteen-inch motor class the winner was William Lind, 969 West Pike Street, who carried off this prize with a model which flew for 3 minutes, 18-1/5 seconds. Second prize went to Barnett Sharp, of Lumberport for a flight of 2 minutes 12-2/3 seconds. Third prize was won by Robert McGregor, 119 Grove Avenue in 1 minute, 35-4/5 seconds. Three commendable flights.

In the Baby R.O.G. contest, the winner was Robert Cunningham, with a time of 1 minute, 47-1/5 seconds. This constituted a new State record. Second place in this contest went to Wilford Talkington, with a time of 1 minute, 43 seconds. Third place was taken by Lind again with 1 minute, 29-3/5 seconds.

The State record for the commercial class models was won by Robert McGregor.

Great interest was shown in an autogyro model plane constructed by Robert McGregor.

Brooklyn Central Y. M. C. A. The members of this club have been working on the Bellanca CH, and great interest has been shown in this model. This club, formed by Mr. Boyson, Boys' Director, meets every



George Malouin of Brockton, Mass., winner of the silver cup for the best all around model airplane

Thursday afternoon, and under proper tuition, members are quickly learning the main points about model building.

Twenty members—and still growing—is an indication of the interest in the Jersey City Y. M. C. A. club of the American Sky Cadets, writes Mr. Ledlie, Boys' Director.

The group meets weekly to work on projects suggested by the leader.

Since the middle of October, a flying model of a Stinson-Detroiter has held the attention of the members. These models are now nearing completion and should be ready for trial flights shortly. A special contest will be held and prizes awarded for the model flying the longest period and also for the model which shows the best workmanship.

John Reyle, who is the Flight Commander, plans the work for each meeting and gives personal attention to the needs of the members of the club.

After completing the Stinson-Detroiter model, the members of the group plan to work on individual projects of experimental nature.

THERE are some interesting features planned for the club in the near future. One is a trip to the Newark Airport, during the latter part of January. Another is an exhibition of model airplanes planned for early March, and also participation in all district meets of the Sky Cadets planned for the spring.

Although this group of Sky Cadets is sponsored by the Y. M. C. A. of Jersey City, it is not limited to the members of the "Y".



### Fairmount Club Report

The Fairmount Model Airplane Club was organized in 1927 by its founder and president, Yale Mintz.

The club holds its meetings in the school workshop through the courtesy of the principal and the manual training teacher.

John Kotlaz of Elizabeth and his model of the Ford Tri-Motor plane which he built in ten months. Photo shows him pointing out details of plane to the boys



A group of model makers taken in the Sky Cadets' laboratory in New York showing four girl members. In the center is Jesse Davidson, one of the instructors



The purpose of the club is to teach its members the fundamentals of aviation and model building and also to arouse the public interest in aviation in Public School No. 44, the Bronx, N. Y. C.

During the year of 1928 a series of contests were held. At the end of the year three medals were awarded to the members who had the most number of credits. The credits were as follows:

First prize: Gold medal, Yale Mintz, 19 points.

Second prize: Silver medal, Israel Rothman, 13 points.

Third prize: Bronze medal, Fred Koskie, 12 points.

An exhibition of the models made by the members was also held and proved a great success, and it is hoped that this will become a yearly feature.

—o—

### Model Makers Form First Flying Troop

Six boys, all of whom have built their own airplane models, form the nucleus of what is said to be the first Flying Troop in the Boy Scouts. They have just been organized into a troop, which will be sponsored by J. Don Alexander, of the Alexander Aircraft factories, Colorado Springs, Colo.

In order to qualify for this new troop boys must be at least 16 years of age, and take an especial interest in aviation and glider flying. Some of the six boys are already enrolled in the high school airplane motor class, which is in charge of the motor expert of the Alexander plant. All of them expect to win the aviation merit badge at the next court of honor.

**T**HE boys will be given opportunity to visit the Aircraft plant, to work and experiment in the shops, and on the flying field they will observe the planes and gliders, study them, and possibly fly. They will also receive ground instruction in glider control.

This troop will give the older boys something new to work for, as well as help them to be competent in the new age of aviation which is now appearing. At the field there is also a flying school, which will appeal to some of the boys, who, instead of choosing to be ground men, may desire to be pilots. It is an idea, which can be adopted by other troops, whether or not an airplane company is close by.

One of the local consolidated schools has also formed a class in glider flying, open chiefly to the boys who are model makers, and from the nearby hills they will learn to fly and control gliders, study air currents so that they can not only jump off and come down, but can

make altitude and go long distances, as the boys in Germany learn to do.

These boys will not only learn glider flying, but will be taught how to build and to repair gliders. Thus, with a knowledge of glider flying if they want to fly planes, which are motorized gliders, they will be all the more proficient.

The idea of a flying troop was conceived by Mr. Alexander and put into effect through the co-operation of Charles Perkins, scout executive. The six boys, Ralph Degeer, Lloyd Nelson, Floyd Caton, Guy Caton, Joe Kamonka, and Fred Hanke, will, it is expected, have Mr. F. H. Engstrom, an employe of the Alexander Aircraft Company and an experienced scoutmaster, at their head.

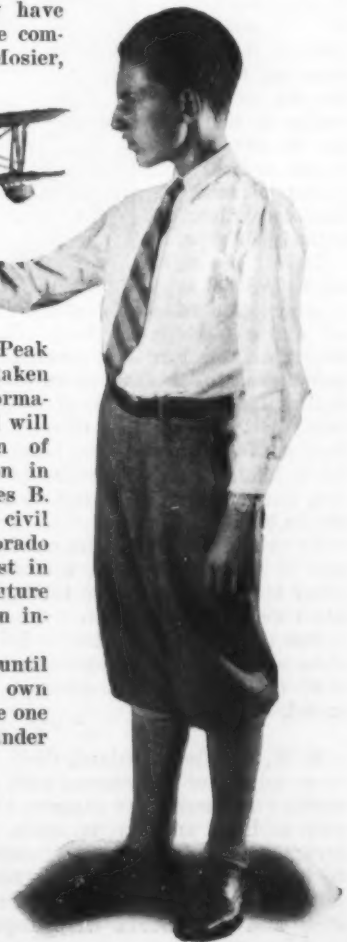
They will not only have the co-operation of the company, but "Red" Mosier,



head of the Pikes Peak Air Commerce has taken an interest in the formation of this troop, and will undertake supervision of the ground instruction in glider control. Charles B. Page, an instructor in civil engineering at Colorado College will also assist in the tutoring of these future leaders in the aviation industry.

It is thought that, until the boys can get their own glider, they will use the one belonging to the Alexander

American Sky Cadet Walter Welsch, 2659 Marion Avenue, New York City, is shown with his flying model of the Loening Amphibian made by himself and presented to Bernarr Macfadden







The interest manifested by John Weide (left), in junior aviation prompted him to travel from his home in Seattle, Washington, to enter the rally. Unfortunately, John did not win a prize



One of the winners of the contest was Violet Jean Babigan of Brooklyn. Her skill at handling her plane won the admiration of all concerned and it was the unanimous opinion of all that she made a better showing than many of the boys

Glider Club, which was manufactured in the factory several months ago, and which has made approximately 250 flights.

—o—

Bob Wichham of Lava Hot Springs, Idaho, who is starting a club in his district, writes in to tell us of his success with a model plane he has constructed entirely of pine.

This model, says Bob, has a wing span of 18" and a fuselage 12" long. He also tells of a novel fitting that he has incorporated in his model, which is proving useful in the matter of propeller design. The hub of the prop, a piece of wood 1-1/2" square, has a hole drilled cross-wise through the grain. The hub is then turned out on a lathe to the shape desired. Each blade of the propeller is then made separately and cut round at one end to fit the hole drilled in the hub.

By this means the blades can be adjusted to any pitch and if they are broken, all one has to do is to cut other blades and fix them to the hub again to the same pitch as the other blade.

Bob also has constructed a helicopter of his own design, which flies quite successfully, he says, considering that this is his first attempt at making this type model.

—o—

E. W. Topping, Ashland, Ohio, is another who writes in to tell us of his success with a Sikorsky amphibian model. The model, he reports, has a wing span of 43" and is built entirely to scale. Patent pine, copper struts and fittings comprise chiefly the material used in this construction. Powder blue and red with black lettering and trim constitute the color idea. One hundred and fifty hours were required to complete the model.

Aircraft from 1919 to 1929. Girls putting finishing touches to models of three famous British machines. Left to right: "Postal" machine (first non-stop flight England to India), the Schneider Cup victory machine, and the Vickers-Vimy (first non-stop Atlantic flight and England to Australia flight)



During Christmas week the Boys' Department at the Y. M. C. A., No. 2 South Clinton Avenue, Trenton, held a Hobby Exhibition. Some fine models were on show which had been built by the members of the Airplane Club.

A letter has been received from Robert Meyer of 40 Athol Street, Springfield, Mass., describing the wonderful flight made

by one of his models. Robert is 16 years of age and his twinpusher made a flight of 34-1/2 minutes, flying a distance of about one-half a mile. This plane is of the hydorrassner wing type.

Robert, who is a student in Technical High School, released his plane in the presence of at least twenty-five people and the plane shot up into the air finally coming to rest about one-half mile away. The plane was kept in sight by means of binoculars.

While this flight was not an official flight, it stands high among the unofficial records which have been made during the past year.

—o—

An American Sky Cadet club has been formed by the South Haven Model Airplane Supply Company, under the leadership of Mr. L. H. Streater. The address is 309 Center Street, South Haven, Mich., and boys wishing to join this club are asked to get in touch with the leader.

—o—

Another club recently formed is under the leadership of Mr. T. S. McClow, 902 Market Street, Sunbury, Pa.

—o—

Fort Wayne, Ind. also has its club, James F. Andrews, Jr., 3917 Tacoma Avenue, being the leader.



# How to Build a Camping Hut

Easily Followed Plans  
for a Shelter  
on That Outdoor Jaunt

By  
E. F. FURTH



ONE of the greatest joys in a boy's lifetime is the time he spends in camp. Much of the pleasure comes in the novelty of sleeping outdoors. This is often marred by sleeping in tents that are not properly located or surface drainage in time of storm is not properly provided. Add to this the fact that tents are not always properly aired or ventilated. Many boys are unable to go to camp longer than a week or two at a time. This is often insufficient for acclimating.

Most of our best camps are now providing tent houses to remedy these conditions. With these, we have the advantages of plenty of air, a good roof overhead, a dry floor with plenty of space underneath so that they may be properly policed. They can be screened if desired and canvas curtains provided in time of a driving rain. All of these advantages appeal to the parent who may be miles away.

Bunks are so arranged that the hut can house ten boys, although it may accommodate five more at least. There is a small space where shelving may be arranged to take care of luggage. Sheathing and shingles on the outside three feet up from the floor are also indicated. This, added to the fact that the eaves have an overhang of two feet, makes the dropping of the canvas curtains on the outside unnecessary except in a driving rain. It also adds to the attractiveness of the tent house.

Studding is placed at intervals of two feet, so that 24" screening may be procured and tacked to these studs if desired. It is placed two feet above ground so that it may be kept clean easily.

The bunks are three feet by seven feet and their height from the floor may be determined by the size and number of the boys to be accommodated. It is a basis for thought. It may be erected as it is or it may be added to, or some things may be taken from it but on the whole, it is a substantial building.

Select a site that is desirable with relation to the activities of the camp. If the ground is reasonably level, cut the 1 x 12 x 16 ft. boards for forms into 2 ft. lengths. Nail four of these together, making a form approximately 10" x 12" x 2'. Make nine of these, place four of them so that the piers will measure exactly 16 ft. to the outside corners. Place the balance so that there is one in the center of each side and one in the center of the building. Brace these strongly and be sure that their tops are exactly level with each other.

Mix your concrete in the proportions of one part

cement, three parts stone and five parts sand. Place in forms and allow to harden at least twenty-four hours.

Placing these piers with a depth of 18" in the ground will help to keep the building in permanent shape.

Take the 8 pieces 2 x 6 x 16 ft. for the sills. Cut two pieces exactly 16 ft. long and two pieces 15' 8" long. These will form the outside members of the sill so as to be 16 ft. square. Nail these together in the piers so that the 6" dimension is up and down. Take two more pieces and cut them 15' 8" long. Place them inside and against the 16 ft. pieces and spike them fast with 20 penny nails. Take the last two sill pieces and cut them 15' 4" long and place them alongside of the other outer sill pieces and spike them together. This will give you a sill 16 ft. square on the outside and 6" high.

Locate the center of the front and back sill on the top inside edge. Square this mark down the inside face.

GET your length between the inside faces of the front to the back sill. It should be about 15' 8" long. It may vary slightly, depending on the thickness of the sills. Take your two 2 x 6 x 16 ft. pieces for the sills and cut them to this length. Place them in position from the center of the front sill to the center of the back sill and nail them securely.

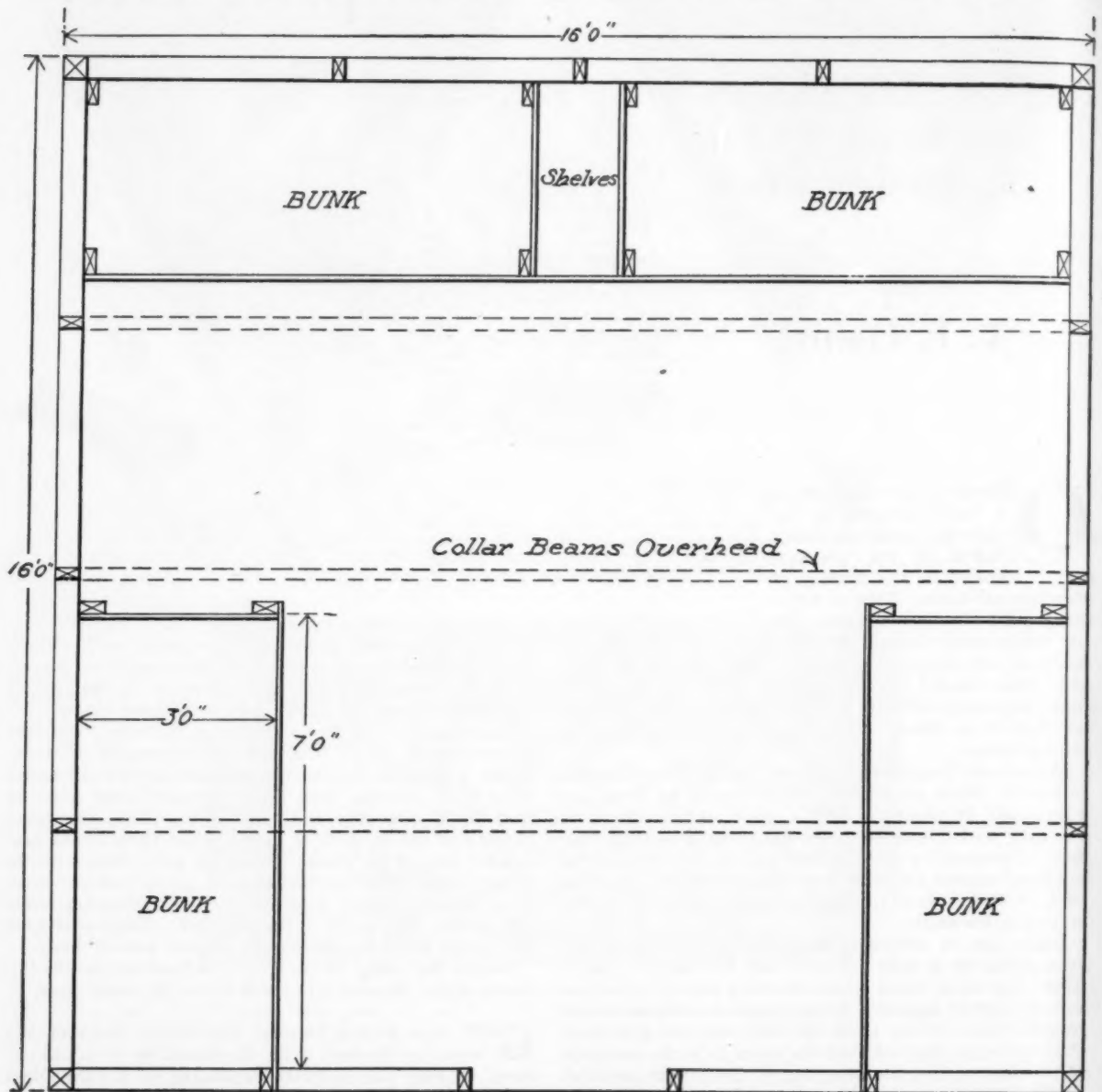
Place the joists on the sills. Be sure they are all the same thickness where they rest on the sills and the girders. Nail them to the sills and girders so that they are 14" between each joist. Be sure that the rounded side of each joist is up for the flooring to be nailed to.

Get your flooring and be sure that all ends are square and at the center of joists, except at the outside ends. Allow no ends of joists or flooring to project beyond the outside of sills. Nail the flooring at each joist with 8 penny nails, making all joists tight.

Get three 2 x 4 x 16 ft. and one 2 x 4 x 12 ft. boards. Spike these at the outside of the platform at the outside edges, leaving a 3 ft. opening at the front for the door. Lay out for location of studs, according to the floor plan.

Saw the four pieces 4 x 4 x 8 ft. off to exact length and nail them to the corners. Take your level and plane these, using good, stiff braces to hold them in position. This is very important as it avoids trouble in placing rafter plates in position.





Cut in your nailing ties and lower studs according to the elevation plans. Lay out the upper side of the nailing ties for location of studding, according to elevation plans.

Cut the eight pieces  $2 \times 4 \times 16$  ft. for plates to exact length and prepare the ends according to the detail plan for plate end lap. Cut studding to exact length and nail in accordance with elevation plans.

Take the twenty-two pieces  $2 \times 4 \times 12$  ft. and mark the rounded edge so that this edge will be the top of the rafter when in position. Select a good, straight piece and lay it out according to the rafter detail. Cut this and use as a pattern for laying out the balance of the rafters. Lay out the rafter plates according to the plans. Notice that the four outside rafters are not notched for the plate.

Lay out the  $1 \times 6 \times 12$  ft. ridge poles so that the outside face of the outside rafters are 2 ft. beyond the face of the corner posts. Erect your rafters and cut in

gable studding according to plans. Cut in the  $1 \times 6 \times 16$  ft. board between rafters.

Select good, straight lath and mark it off one inch and a half longer than the top edge of the rafters. Take a pair of dividers and set them so that this length may be divided into twenty-three equal spaces. These will be approximately  $5\frac{1}{2}$ ". Place this on the top of the outside rafters with the top end at the center of the peak. Drive a nail into the rafters slightly at each of these markings and this will give you the location of bottom of each shingling lath and in turn, the bottom of each course of shingles. Take a line and draw it tightly between each set of nails so that the roof lath will be put on straight. Nail on your shingles, allowing them to project one inch beyond rafter ends and face of outside rafters. Be careful of joints in shingles so that they will not come over the top of each other and cause a leak.

Nail lath on gable ends in (Continued on page 64)







# A Course in Airplane Designing

By Mastering This Valuable Course, the Model Builder of Today Lays the Cornerstone for His Career as the Aeronautical Engineer and Designer of Tomorrow

Article 4.

By KEN SINCLAIR

**I**N presenting this course, MODEL AIRPLANE NEWS wishes to stress the fact that model building is more than a mere sport. If the builder of model airplanes learns the fundamental principles underlying airplane flight and design, he prepares himself for a future career in the most profitable phase of aviation.

The policy of MODEL AIRPLANE NEWS is not to encourage or teach its readers to become pilots, but rather to become aeronautical engineers, designers, salesmen, manufacturers, or equip themselves for any other positions which require the training of the specialist or executive. Study this course from month to month, master it in every detail and you will gain a fundamental knowledge of the how and why of airplane design which will be second to none.

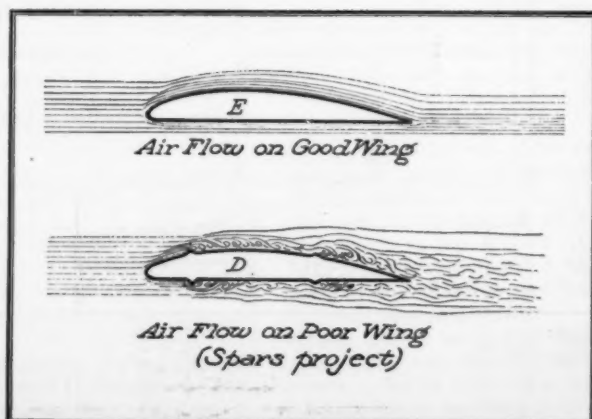
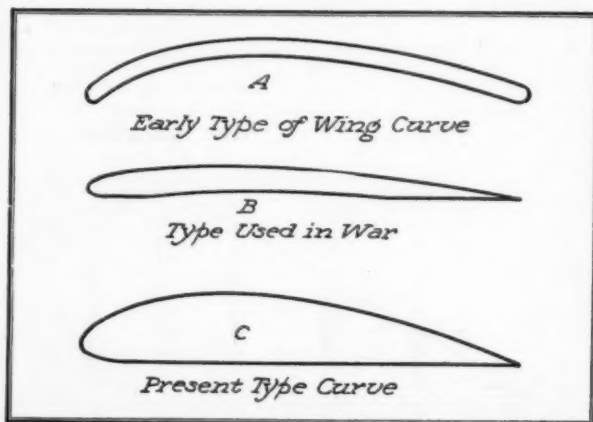
THE EDITOR.

**O**NE of the most important things in the design and construction of model airplanes is streamline. Many model builders, however, doubt this statement saying, "Aw, what difference can a little bit of square strut or of flat wing edge make?" It can make a very great deal of difference.

A circular flat plate, set against the wind, with an area of one square foot, has from twenty-five to thirty times as much resistance to the air as has a circular streamline of the same maximum cross-sectional area! Think of it! Think of how this drag holds back your model, cutting down its speed and distance, using up that precious power that you need to pull the ship along through the air, to push the air in front of those square struts and flat wing edges!

Then why leave square corners and flat edges? Leading edges of wings and tail surfaces can easily be rounded off, and streamline struts are not hard to make. Put a spinner on your prop, round off your ship, and note the increase in speed and endurance you get. It's worth the work.

Wing curves are



Circular Flat Plate Circular Streamline

Wind →



Drag on Streamline of Same Cross Sectional Area is Approximately  $\frac{1}{25}$  that of Flat Plate.

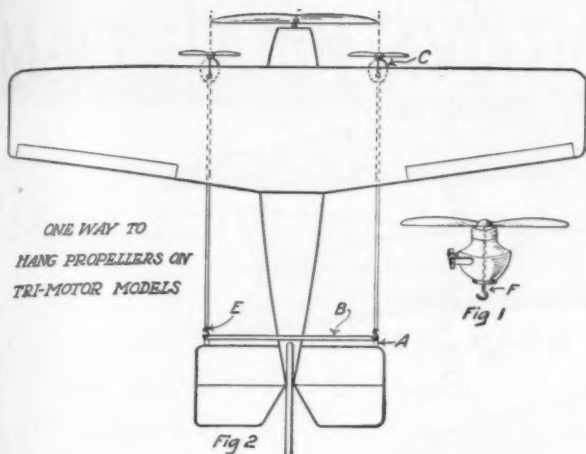
closely allied to streamlines. A wing, to give the best results for the model builder, must have a good  $l/d$  ratio. This means that the lift ( $l$ ), must be greater than the drag ( $d$ ), and the more the lift exceeds the drag the better for the ship. In order to give lift the wing must be curved, at least on the upper surface, so that the air when rushing over it creates a vacuum, which in turn lifts the ship. To cut down the drag, the air must pass over

and under the wing smoothly, as shown in Figure E, not as in Figure D where the air flow is broken up by the wing spars, which extend beyond the rib outline.

These projections break up the air, causing turbulence, cutting down the lift and adding to the drag. It is just like skating. When you skate over smooth pavement you can move rapidly with little effort, but when you come to a rough spot you slow down, even though you exert more effort. The smooth pavement offers little resistance, while the rough pavement offers much more, requiring more effort to keep up the speed.

Thus with a wing, if  
(Continued on page 52)





# Hints to Model Makers

Here Are a Few Shortcuts  
which Should Prove of  
Value to Model Makers

## A Bomb Release

By E. W. Franklin

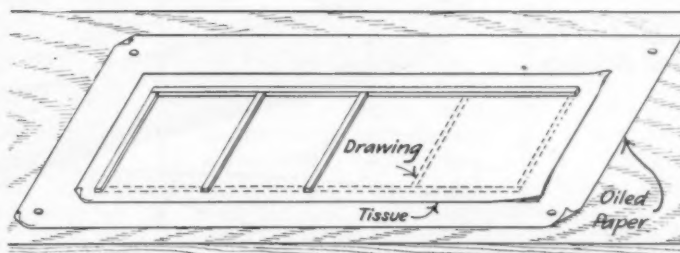
Two hooks ambroided to center rib hold bomb until plane begins to descend. As plane noses downward, bomb falls out of hooks and drops. Plane should be given a high climbing angle. Bombs can be made with a small cap so that they will explode.

## A Simplified Covering Method

By Yale Mintz

Some model builders have found it hard to cover the wings of their planes tightly when they build a featherweight flying model. The method shown not only keeps the paper tight but assures the builder of a perfect butt joint.

Place your tissue paper on top of a sheet of oiled paper (cement won't stick to oiled paper, though it would to your table), pin it smoothly to a plain pine board, and mark out on the paper the exact places where you want the wing spars to lie. Now, using a razor blade, cut your wing spars to the proper lengths, give them light, even coats of cement or glue and glue them in place. Do the same thing with the ribs and apply a drop of glue to the intersections. The next step is to trim off all excess paper. You can do this with a razor blade, but be careful you do not cut into the balsa.



IMPROVED METHOD OF CONSTRUCTING WINGS

The most convenient way to handle sandpaper is in the form of a block as drawn. The sandpaper is cut to fit around the block on each end and secured by a nail driven through ends and into block. The block should be of a size to fit your hand, 1" thick, 2" wide and 5" long. A number of sheets are fastened to the block and as they wear away, tear them off, leaving a fresh sheet exposed, and ready for use when needed for the next job.

G. C. Skurko comes through with some good suggestions concerning landing gear and washers, as amply demonstrated in the sketches.

## A Good Sandpaper Block

By M. R. Hunt

## Tri-Motor Propellers

By William Simmons

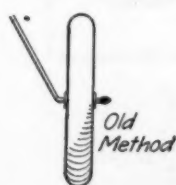
To have revolving propellers on each side of the main prop on a tri-motored model airplane, fix a piece of spruce 1/8" x 1/4" x 1/4" less (B) 1/4" of length of one side of stabilizer and arrange as shown in diagram. Support it with a piece of pine or spruce 3/16" x 3/16" x 3/4" respectively.

(A) Propeller motors are attached to S hook (E).

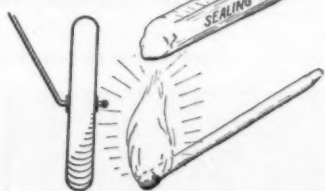
Propeller shaft may be in (C) compartment or out as in (F) Fig. 1.

Note main prop ends must be even with center of side prop. (D) Aluminum salt shakers may be used for compartments. (See additional sketches on page 44).

## TIME SAVING DEVICE FOR WHEELS

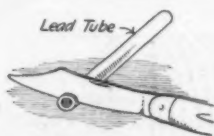


Ambroid does not keep round shape and dries to a film-like substance



Put a drop of sealing wax on end of wire. Dries quickly and is more rigid and durable.

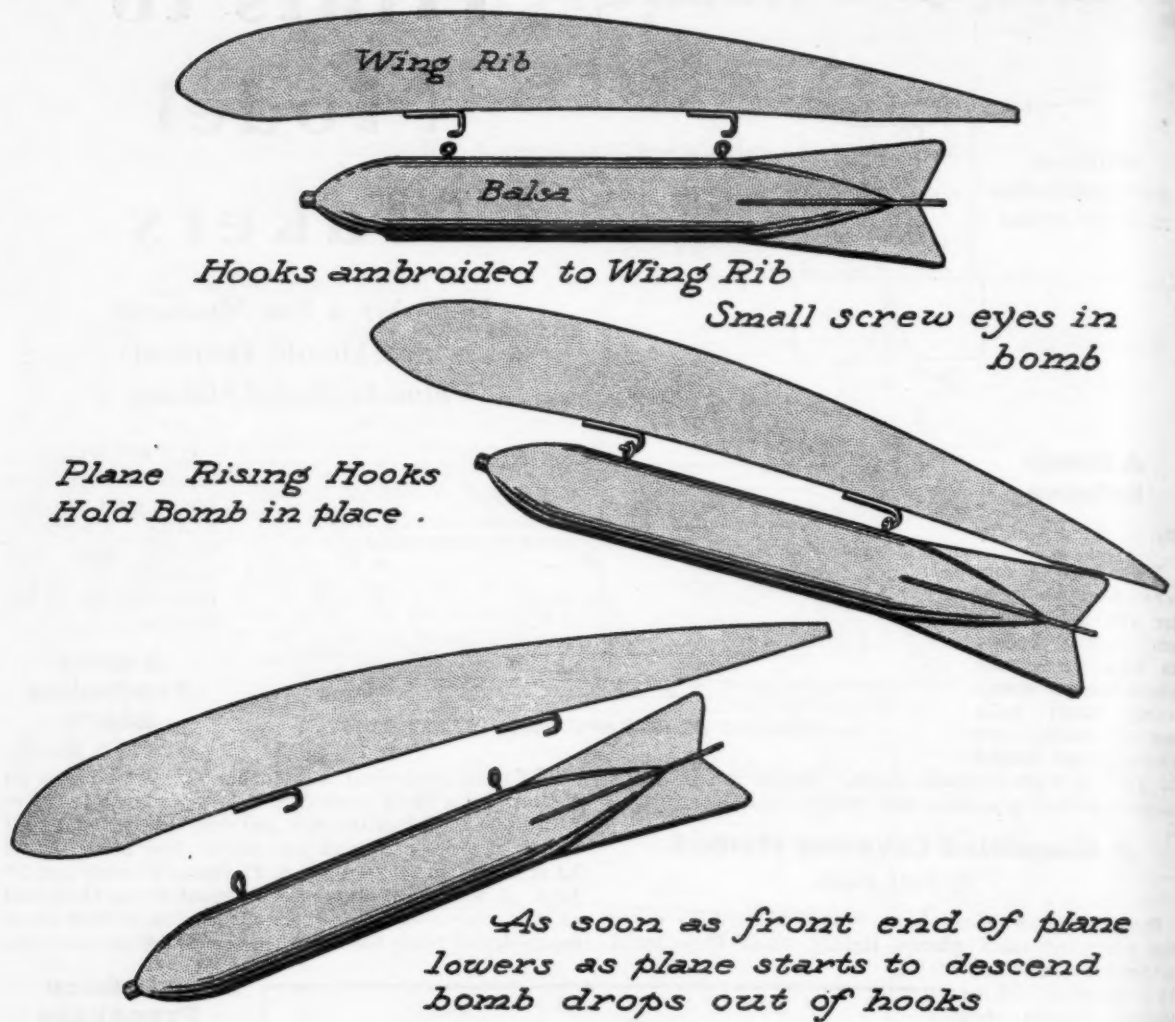
## EMERGENCY WASHERS



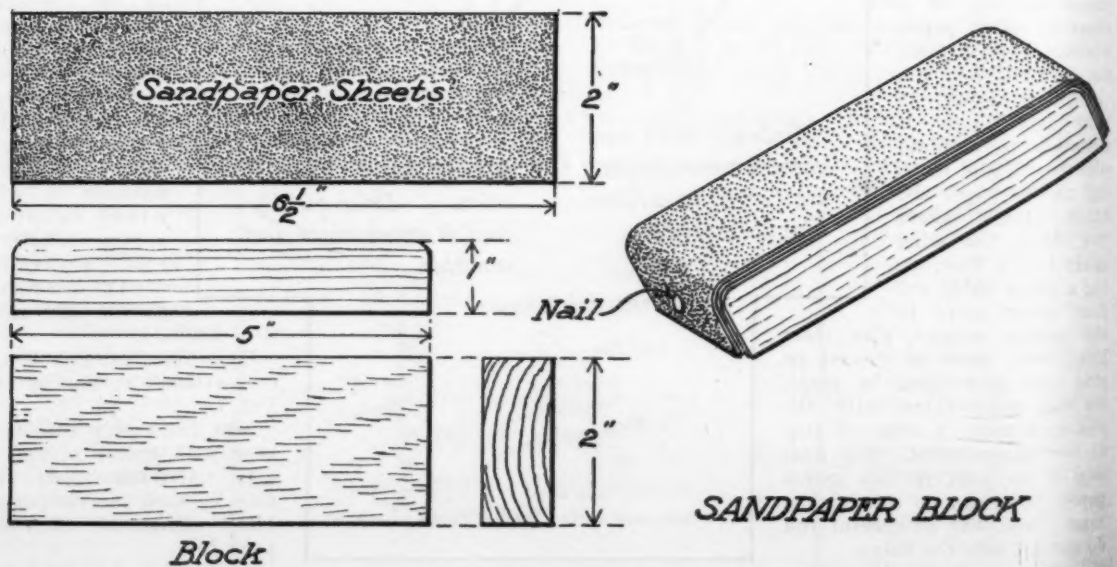
Cut with sharp knife to make round uniform washer. Flatten Slightly







### BOMB RELEASE





# MACFADDEN AVIATION ADVISORY BOARD

*Don't you know?*

*Ask us!*

**W**HAT school do you recommend?

Is So-and-So school a good school? If I attend This-and-That school and get a certificate, will I become a pilot?

These and scores of similar questions concerning flying schools have been asked by many hundreds of readers who have written in during the last month; so let's dive into this problem.

It is not our policy to discriminate between schools. This is not the first time we have advised you boys on this matter.

Our warning to you always has been to digest thoroughly all details concerning the school at which you intend taking up your flying lessons.

We publish below the latest list of schools as issued by the Department of Commerce, Aeronautics Branch. All these schools have government approved licenses.

With such approval, naturally one is assured of proper treatment. The government test for such schools is a stiff one and to have passed it is to be highly commended and it speaks well for the training given at such schools. The latest list of these schools is:

**AIRTECH TRAINING SCHOOL,**  
Airtech Field,  
San Diego, Cal.

**AERO CORP. OF CALIFORNIA, INC.**  
Aero Corp. Field,  
Los Angeles, Cal.

**EMBRY-RIDDLE FLYING SCHOOL,**  
Lunkon Airport,  
Cincinnati, Ohio

**PARKS AIR COLLEGE, INC.,**  
Parks Airport,  
E. St. Louis, Ill.

**D. W. FLYING SERVICE, INC.,**  
Le Roy Airport,  
Le Roy, New York.

**T. C. RYAN FLYING SERVICE,**  
Ryan Airport,  
3300 Barnet Ave.,  
San Diego, Cal.  
(in combination with Pacific  
Technical Univ., 2112 Kettner  
Blvd., San Diego, Cal.)

**UNIVERSAL FLYING SCHOOL,**  
Wold-Chamberlain Field,  
Minneapolis, Minn.

**E**ACH month the Macfadden Aviation Advisory Board will endeavor to answer all questions concerning model building and aviation in general. Address all questions to

**The  
Macfadden Aviation Ad-  
visory Board,  
MODEL AIRPLANE NEWS  
1926 Broadway,  
New York City**

**Enclose with your let-  
ter a self-addressed and  
stamped envelop to fa-  
cilitate an answer, as  
space is limited and all  
letters can not be an-  
swered in these pages.**

**CURTISS FLYING SERVICE,**  
Valley Stream Airport,  
Valley Stream, L. I., N. Y.  
(in combination with New York  
University, New York, New  
York.)

**UNIVERSAL FLYING SCHOOL,**  
Lambert Field,  
St. Louis, Missouri.

**CURTISS FLYING SERVICE,**  
Grosse Ile Airport,  
Grosse Ile, Mich.

**CALIFORNIA AERIAL TRANSPORT FLY-  
ING SCHOOL,**  
Municipal Airport,  
Los Angeles, Cal.  
(in combination with Western  
College of Aeronautics, Muni-  
cipal Airport, Los Angeles, Cal.)

**CURTIS FLYING SERVICE, OF THE MIDDLE  
WEST.**  
Fairfax Airport,  
Kansas City, Kansas.

**PORTERFIELD FLYING SCHOOL,**  
Fairfax Airport,  
Kansas City, Missouri.

**VAN HOFFMAN AIRCRAFT SCHOOL,**  
Lambert Field,  
Anglum, Missouri.

**CURTISS FLYING SERVICE,**  
Oakland Airport (flying), Oak-  
land, Cal.,  
1258 Russ Building, San Fran-  
cisco, Cal. (ground).

**CURTIS FLYING SERVICE OF THE MIDDLE  
WEST, INC.**  
Curtiss Reynolds Airport,  
Glenview, Illinois.

**BOEING SCHOOL OF AERONAUTICS,**  
Oakland Municipal Airport,  
Oakland, Cal.

**SPARTAN SCHOOL OF AERONAUTICS,**  
Apache Blvd. & Chamberlain Dr.  
Tulsa, Okla.

**CURTISS FLYING SERVICE,**  
Los Angeles Municipal Airport,  
Inglewood, Cal.

**ROOSEVELT AVIATION SCHOOL, INC.,**  
Roosevelt Field No. 1,  
Mineola, L. I., N. Y.

**UNIVERSAL AVIATION SCHOOL,**  
344 No. Exchange St.,  
St. Paul, Minn.  
(in combination with Universal  
Flying School, Wold-Chamber-  
lain Field, Minneapolis, Minn).

**CURTISS FLYING SERVICE OF SOUTH,**  
Memphis Municipal Airport,  
Memphis, Tenn.

Of the hundreds of other questions asked, many have been chosen and are answered as follows:

The average speed of a Curtiss J. N-4 is sixty miles per hour.

You enlist in the Army Air Corps through the regular United States Army Recruiting Service, but if you wish to become a cadet and learn to fly, you make application for appointment as a cadet to The Adjutant General, Washington, D. C.

The age limits for the Army Air Corps Cadets are twenty and twenty-seven.

The fins of a plane are small auxiliary airfoils, usually made of metal or wood — (Continued on page 61)



## "Cloud Hopping" Pirates

(Continued from page 6)

He went to the car which had run off the road and returned with a length of stout rope. Swiftly, as though he were accustomed to such matters, he trussed up the unconscious lad, and carried him to the bushes that lined the road. Glancing furtively to the right and left to make sure his movements were unnoticed, he dumped the prostrate form behind the leafy screen, being careful to rearrange the foliage, thus obscuring his tracks to the casual passerby.

He climbed back into the car, stepped on the starter, and without as much as a look behind him, speeded back up the road to Morgan Field.

It was a bright gay dawn when consciousness returned to Jimmy. He stirred uneasily, groaned, and opened his eyes. His first reaction was one of amazement when he failed to see the familiar outlines of his own room. He attempted to move his hands but found that he could not. He stared at the warm friendly sun in utter astonishment. Then, in a flash, memory returned.

**O**NE burning thought became uppermost in his mind. In all the mysterious, inexplicable happenings of the previous night one salient fact stood out. *Someone was trying to injure Spike's plane.* He must get word to him before the take-off! He looked again at the sun and estimated the time as being between five and six o'clock.

Exerting every ounce of strength that remained in his weary muscles he attempted to wrench his hands free. His heart gave a bound as he felt the hastily tied knot loosen, and

allow him more play. Despite the burning pain in his chafed wrists, and the dull ache in his left arm, he persevered; just as the sun peeped over the top of the berry bush in front of him, one hand came free. It was a matter of a moment to loosen his remaining bonds.

Stiff and aching in every part of his body, he arose and stretched mightily. The cool morning air revived him, and he felt the warm healthy glow of youth as the blood sang joyfully back to his numbed hands and feet.

But there was no time to be lost if he would catch Spike. Leaping over the roadside greenery, he sped up the road toward the flying field.

As the bulky hangars hove in sight, he noted that Spike's plane was not yet up in the field. Thank Heaven he was in time! He slowed down somewhat with a sigh of relief. As he reached the Field Superintendent's office he saw that the time was only 5:45.

The assistant superintendent threw a frown in his direction as he burst in the office.

"Don't come barging in like that, my boy," he begun officiously, but Jimmy cut him short.

"Spike's plane," he gasped. "Look at Spike's plane. Some one was monkeying with it, last night."

The assistant superintendent looked at him as though he were crazy.

"Spike's plane?" he repeated. "It's all right. Spike took off half an hour ago."

"Half an hour ago," Jimmy groaned in dismay. "But he wasn't scheduled to hop till six."

"Everything was set, so he left as

soon as he arrived. Why, what's wrong?"

"Send some one after him at once," yelled Jimmy. "Something crooked's going on."

**T**HE assistant super polished his nails on a piece of blotting paper.

"If you'll stop giving me orders," he said coldly, "and tell me what the matter is, I may be able to do something about it."

Jimmy realized that if he was to get any action he must change his tactics. He forced himself to remain calm while he unfolded the story of the night's adventures. When he had finished the assistant super replaced the blotting paper on the table and looked bored.

"Tut, tut," he said, as one would talk to a child. "You've made a mistake somewhere. The plane was thoroughly examined before she left. Everything was O. K., and Spike took her off perfectly. You probably got in a fight with some mechanic in the dark and he played a joke on you."

"Yeah," said Jimmy sarcastically. "And the mechanic had a car waiting for his getaway and then slugged me on the head and tied me up all for a big laugh, eh?"

"Listen," he continued seriously. "You've got to do something—if not for Spike then for the service. You know how much cash he was carrying today. What if something is wrong and it's stolen?"

This argument at last gained the other's temporary interest. He considered it in silence for a moment.

"Well," he said thoughtfully, "there's something in that. But even if I wanted to do anything I can't. There's no one on the field yet but Langdon and he's taking out a passenger in his plane in a few minutes."

He jerked his thumb toward the window where the ground crew could be seen wheeling out a Curtiss biplane.

"Then send Langdon," demanded Jimmy. "There's a life and a fortune at stake."

The assistant super looked shocked.

"The Morgan Air Line never fails a passenger," he said sententiously.

"Then send me. Someone's got to go."

Again the dapper figure behind the desk registered painful shock.

"You?" he queried dubiously. "Why you're not even licensed."

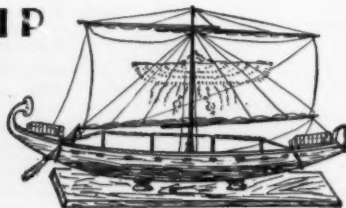
"What of it? I can fly."

The assistant super looked as though he were tired of it all.

"Don't be silly," he said in a voice that permitted of no argument. "I won't let you go. I haven't any one else to send. And anyway, Spike's all right. If you want to discuss it

(Continued on page 48)

## SHIP



## MODELS

**A**S an another attraction, for those who wish to make other models in addition to airplanes, we are starting shortly a series of articles, with full sized plans, on how to make ship models, by the celebrated authority

**Capt. E. Armitage McCann**

These models will be correct, of historic interest, good to look at and easy to make

The first will be a picturesque

**EGYPTIAN SHIP (About 1500 B. C.)**

Watch for this series and start at the beginning.



## Major Rockwell's Graduates Make Good



**"Few Instructors Take the Interest You Have Shown"**

Dear Major: Few instructors take the interest in their students you have shown in me.

I will be glad to recommend your method of training to anyone who intends to take up aviation and know that if they follow your instructions as laid out they will be successful.

Assuring you of my sincere appreciation for all the things you have done for me, I am

Thos. H. Hatton,  
Scranton, Pa.



**"Your Instructions and Service Best Obtainable"**

Dear Major:

I deem it an honor to be one of your students and have always found your instructions and service the best obtainable, because you give your students the knowledge needed by them in the simplest, shortest method possible. I will boost you and your individual method of training to all who are interested in the study of aviation.

Edward Rutledge,  
Louisville, Ky.



**Proud to be a "Rockwell" Man**

Dear Major:

I want, at this time, to express my appreciation for the courteous attention I have always received from you.

I feel sure there are very few instructors who work so closely with their students, and I am sure that your individual method of training will continue to grow and prosper for many years to come. I am always proud that I am a Rockwell trained man and consider you to be one of the most competent instructors today.

Douglas W. Shafer,  
Hamilton, O.



**Major Rockwell Says:**

## "I'll Train You at Home and Until You Have an Aviation Job Paying \$300 to \$400 a Month!"

I make this amazing offer, for a short time and to a limited number, to supply the crying need for trained men. Here is your opportunity to get into this uncrowded, fascinating field with a definite certainty of your future.

### In 12 Weeks!

Just devote about an hour a day to my Home Study Course, and in 12 weeks you can be mastering the principles of Ground

### No Advance Education Necessary or Experience Needed

You don't need to have a high school or college education to master my course. You do not even need to know anything about airplanes, motors or mechanics. My home course is thorough and complete. Everything is so clearly explained, with easy-to-understand text and pictures, that in a few short months you will be able to grasp

Training, which are necessary before you take your place in any branch of Aviation. In a few short months I will give you practical aviation training and prepare you for one of the big pay, thrilling jobs open only to men thoroughly trained in Aviation.

every fundamental principle of Aviation ground work and you will be well on the road to qualify for any important aviation job paying \$300 to \$400 a month. My Home Study Course will give you all the knowledge necessary to pass the government's written examinations for mechanics' or pilots' licenses.

### You Learn Principles of Aviation at Home Then Choose Any One of 40 Ground Jobs. --If You Want Actual Flying, My Home Study Course

teaches you the principles of flight. When you have completed the ground training I will arrange for you to take your flying instruction at any licensed airport near your home at special reduced rates. Or if you want you can come here to Dayton and get training at one of the finest and best equipped airports in America. No matter where you learn to fly you can qualify for a pilot's license and a high pay flying job in passenger lines, mail service, and other important branches of flying.

### Employment Service

After you graduate I assist you in getting a job without any cost to you. Right now the demand for trained men is greater than the supply. A place is ready for you!

### Your Job Is Here

### Only Trained Men Can Qualify in Aviation

The big money in Aviation does not go to the novice or apprentice. Only **TRAINED** men can command the high salaries. Employers are glad to pay big money for men who know Aviation—builders, mechanics, service and maintenance men, and flyers. Let me prepare you for one of the many high-salaried Aviation jobs open to the trained man. I will prepare you to take your place in the most fascinating, fastest growing industry in the world. Act now while my special offer lasts. Rush this coupon to me for a copy of my famous free book.

### Satisfaction or Money Back

I am so sure that you can learn Aviation with my help and step into a big aviation job that if you are not satisfied when you have finished my course, I agree to return every penny of your tuition.



**My Ground School Course Enabled Rickels to Solo in 7 Hours—at a Big Saving**

Dear Major:

Your excellent advice prevented me from taking up Aviation the wrong way when I wanted to learn flying first. After I had completed your ground course, which thoroughly prepared me in the principle of flight, I was able to solo in 7 hours. I always will be glad to tell anyone that I am a Rockwell trained man.

Wm. C. Rickels.

**MAJOR ROBT L. ROCKWELL**

**The DAYTON SCHOOL OF AVIATION**  
Desk C-25 DAYTON, OHIO

### Former Photographer Now Manager of Big Company

Dear Major:

The main thing about your individual method of instruction was that you not only gave me a thorough knowledge of Aviation, but you also showed me how to capitalize on what I learned. I am now General Manager for International Air Surveys and making three times what I ever earned before. I will always be a booster for your method of training.



Floyd Prothero

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Major Robt L. Rockwell  
The Dayton School of Aviation  
Desk C-25, Dayton, Ohio.

Dear Major—Please send me FREE and without obligation a copy of your famous book on Aviation; also your special tuition and position offer.

Name .....  
Address .....  
Town..... State..... Age.....



## Our Message To All Advanced MODEL AIRCRAFT ENGINEERS

### Who Are Known As, Just "Model Airplane Builders"

We are about to enter a new era of constructive model aircraft engineering and building and it will not be far into the future that we shall see scientifically designed models of full size aircraft out-performing the present day freak "featherweight" models.

To back this prophesy and to show what faith we have in it, we are devoting a great deal of time and energy to the testing of materials and the advancement of aerodynamics as applied to model design. We are now preparing a wind tunnel in which we shall test models for proper wing, stabilizer and fin settings, drag, the proper pitch and diameter of propellers for each individual model, the wing curve most suited to the individual requirements and so on. The wind tunnel is only one of the many instruments used in the designing of successful model aircraft.

Would you care to be advised of our progress and to receive literature of our new creations—the modeling of full size aircraft, of which the neat Great Lakes Sport Trainer is first? Such information will follow our catalog to your address.

Our catalog contains many items of tested materials which will save you time and money. It is unwise for an advanced model aircraft engineer to buy untested and inferior materials.

Are you one of them?

**Cleveland Model & Supply Co.**  
MODEL ENGINEERS  
Established 1919  
Cleveland, Ohio

◆ ◆ ◆  
To delay is to forget  
MAIL THIS COUPON—TODAY

Cleveland Model & Supply Co. 3-30  
1866N West 57th St.  
Cleveland, Ohio.

Gentlemen:

Kindly send me information regarding your new models as you produce them and a copy of your catalog for which I am enclosing 10c in coin.

I am printing below, my

Name.....

Address.....

City..... State.....

Model Experience..... yrs. Age..... yrs.

(Continued from page 46)

further, wait until the super gets here and talk to him. I'll take the responsibility for what I'm doing."

Jimmy turned away in disgust. His heart was lead in his breast. There was Spike heading over the treacherous Rockies with some unknown peril hanging over his head like the Sword of Damocles.

He walked out into the morning sunlight and gazed at Langdon's plane waiting on the tarmac. Langdon exchanged a word with one of the mechanics and headed for the pilots' quarters.

An impulsive daring idea came to Jimmy. Super or no super he would be at Spike's side if danger threatened.

**H**E waited until Langdon's stocky figure had disappeared through the wooden door, then assuming a nonchalance that he was far from feeling he sauntered toward the trim biplane.

"Hello, Joe," he greeted the chief of the ground crew, and headed for the cockpit. "Langdon told me to warm her up for him. I'll taxi her across the field."

The mechanic nodded affably as Jimmy clambered into the cockpit.

Jimmy revved the motor. As he tuned her the slipstream flung off a hurricane of the fresh morning air. The chocks were pulled aside, and the biplane started on her taxi across the field which, as the ground crew later realized, was to be the longest taxi in the history of aviation.

His engine crackled fiercely as he swung into the wind; and then as the assistant super came rushing from his office in answer to the startled yell of the mechanics, Jimmy raced her across the field. Taking off gracefully, the Curtiss appeared, to the untrained eye, to almost brush the tops of the swaying maples that lined the west side of the field.

Straight into the east he flew. The drumming monotone of the perfectly functioning motor was sweet music to his ears. The fresh morning breeze blew into his very soul, causing him to forget the pain in his arm, and even tulling his apprehension for Spike.

He eased the throttle open to its full extent. Speed was essential if he were to catch Spike. Stalwart, majestic pines reared their vernal heads at the base of a vast mountain, as Jimmy approached at a full one hundred and fifty per. He was flying dangerously low, and preferring to gamble on a possible tail-spin, rather than a devastating crash into the timber, he sent the ship skyward at a risky angle.

The biplane answered his guiding hand and cleared the tree tops with two hundred feet to spare. He held the stick back, keeping the ship on the climb. His keen blue eyes wandered from the rocky panorama below to a careful scrutiny of the

horizon as he kept the vigil for any sign of Spike.

For almost two hours his engine whirled evenly, and his search went unrewarded. When suddenly far down to the left, his eye caught a familiar sight. There four thousand feet below him, resembling two great silver ants upon a table-shaped plateau, were a pair of planes, moving slowly across the ground preparatory to taking off.

His keen flying eyes noted even at that great distance, that one of the planes bore a strong likeness to Spike's mail ship. Puzzled, he resolved to keep out of sight and observe developments.

What was the other plane? Who was in it? Had Spike been kidnapped in his own ship? He was baffled. A thousand theories rushed to his mind. Second only to his concern for Spike's welfare was his worry about the mail sacks and the gold.

He pulled back the stick and shot towards the ceiling. To follow unseen was his motive.

The two planes rose gracefully off the plateau, zoomed upward and cleared the mountain wall to the south. Jimmy circled and banked, waiting for his quarry to turn either east or west. If they headed for either Salt Lake City or Cheyenne, things were probably all right, and he had nothing to worry about save the super's wrath on his return.

However, as he had already suspected, they did neither, but speeding high over the snow-capped peaks followed a course due south. Maintaining his altitude Jimmy followed high up over their tails.

For something over an hour the chase proved uneventful. Jimmy estimated that they must be well into Colorado by this time, but to what purpose utterly baffled him. If Spike had met with foul play, why had his plane been taken? On the other hand if Spike was still unharmed and carrying the mail, why had he taken this direction?

**F**OR a fleeting moment it occurred to Jimmy that Spike and some accomplice might be making off with the gold, but a second later he felt ashamed of this suspicion. No, something was wrong and it was his duty to find out exactly what. From his great altitude he continued to follow the two machines and then his heart leaped as he saw them slowly settle to rest in a lush green valley in the heart of the mountains.

Swiftly he Immelmanned coming out of the stunt at a still higher altitude and speeding back in the direction from which he had come. It would not do to be observed at this stage of the game. Once beyond the sight of the vale in which the others had landed he banked, sideslipped and with a dead engine dropped through the air. At 2,000 feet he righted the ship and cast about for

(Continued on page 50)

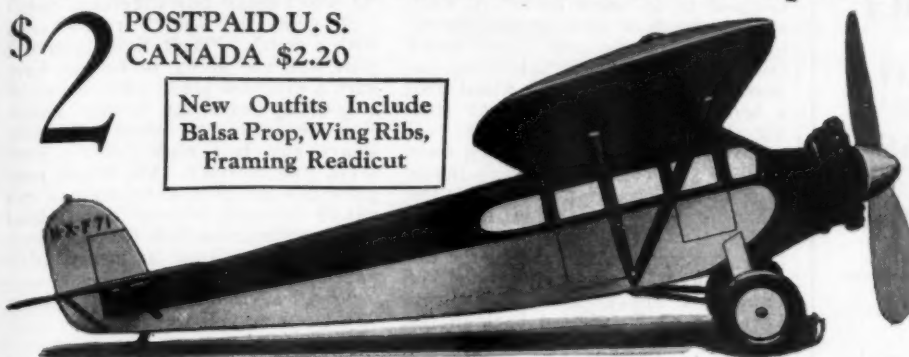


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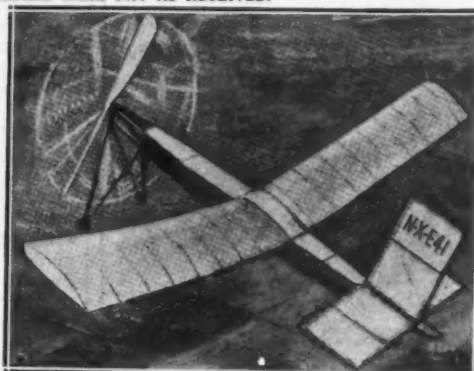
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Write for our free booklet  
on model construction

(Continued from page 48)

a landing place which would be near enough to reach Spike's plane on foot, but far enough not to be heard by whoever was in that other ship.

His search proved futile. He was hemmed in by sheer mountain wall, and on the floor directly underneath him were mounds of short rocky crags which rendered a landing impossible. While circling about like a bird looking for a familiar resting place it occurred to him that all this time Spike might be facing some terrible danger. He decided to throw caution aside and land alongside the other planes. Stretching his arm under the cockpit, he muttered a fast prayer, which he considered answered at the reassuring touch of Langdon's heavy service revolver. Levelling off he started back to the valley.

Whirring over the tree tops at a low elevation, he saw a dilapidated cabin some two hundred feet to his left. He came down prettily, flattened out at precisely the right moment, and achieved as good a landing as possible on the bumpy earth.

Before his propeller stopped whirling he had jumped from the plane the big forty five held firmly in his fingers. Approaching him from the shack came a man. Langdon's revolver glinted in the sun.

"Where's Spike Hennessy?" demanded Jimmy.

The other hesitated.

"Out with it," snapped Jimmy. "Where is he?"

"In the cabin," said the other. "Say put that gun down. It's all right. Spike's hurt. We picked him up."

Something in the man's manner made Jimmy dubious but Spike took precedence over everything else. Retaining the gun in his hand, he made for the cabin.

"You go first," he said. "And no funny business."

"You got me all wrong, buddy," whined the other.

JIMMY paused and stood aghast at the cabin door. There lying on the floor, a bloody mess, was Spike Hennessy. Jimmy's emotion on seeing his friend in such a condition was his undoing.

"Spike," he called, lowering his gun and rushing to him. "Spike. It's me—Jimmy. What's wrong?"

Another voice came from the other side of the cabin.

"Drop that gun, youngster. You won't get off so easy this time."

Jimmy's jaw dropped in chagrin at having permitted himself to lose control of the situation. Then as he made out the features of the speaker, he recognized the man he had fought with last night.

"Drop that gun," repeated his captor.

Realizing fight at this time was futile, Jimmy let the forty five clatter to the floor, where it was retrieved by the man who had met him outside.

"What's the game?" asked Jimmy.

The crook, with Langdon's gun, unloaded it and threw it carelessly on the table.

"Tell him, Joe," he said shortly. "It won't make any difference now."

"I guess it won't," replied Joe with a smirk. "Well, nosey, you and your pal are going to be left here with a disabled plane while we make a getaway with the twenty grand. You thought you were a pretty smart guy last night, didn't you? Well, you weren't. We faked your pal's gas gauge and let enough gas out of the tank to force him to land where we wanted him to. And here we all are. Just a merry little party."

"Yes," agreed the other, laughing. "Just a merry little party."

SPIKE groaned. Jimmy glanced at him and turned on the thugs. "If there's any manhood in either of you two skunks," he said, his eyes flashing with impotent rage, "get some water for this man. He's badly wounded, you murdering dogs."

"Fix him up yourself if you want to," said Joe. "We got business to attend to."

Looking around the shack, Jimmy espied in the corner an old rain barrel half filled with water. Ignoring the two men who conducted a low-voiced conversation in the doorway, he saturated his handkerchief in the barrel and returned to Spike.

Upon closer examination he found a severe bullet wound in the arm was bleeding copiously, and that more blood was trickling down from a scalp cut that had evidently been inflicted with the butt of a revolver. He bathed the wounds tenderly and was rewarded by Spike's opening his eyes and recognizing him.

"Jimmy," gasped Spike gratefully.

"Yes, old chap. It's me," replied Jimmy, ungrammatically. "Steady old pal, and we'll get through all right."

Spike groaned.

"I doubt it. I'm in terrible pain. I think my leg's broken. They got me."

Jimmy tried to reassure him but Spike, weak from pain and loss of blood would have none of it.

"Never mind the money," he said. "I'm through risking my life in this racket. You remember what I told you about the air service. It's the bunk. Why should I fight for money that doesn't belong to me. What do I care about the mail. Take me to a hospital. Take me Jimmy, at once."

His voice broke about two points this side of hysteria.

Jimmy realized that he had a hard problem on his hands. Bad enough that he and Spike should be left to the dubious mercies of the two thugs, but to have Spike in this condition was complicating matters tremendously. He racked his brains for a plan of action as Spike babbled incoherently of the rotten-



ness and uselessness of the service. He turned to the two in the doorway.

"What are you going to do?" he demanded.

"If you're so anxious to know," drawled the man with the gun, "I'll tell you. In about ten minutes we're leaving you two bozos here. First we'll drain the gas from the planes. It'll take you two days to get anywhere from here. And by that time we'll be where the cops won't look for us. They'll figure that you two have eloped with the dough anyway, that's why we brought your partner here in the first place."

"Listen," said Jimmy. "This man's badly hurt. He's almost delirious from that knock on the head. You can't leave us here without supplies. He'll need water. Leave one plane fueled. I give you my word we'll give you a full hour's start."

Spike half sat up on the floor. "Don't let 'em go, Jimmy," he screamed. "Don't let 'em leave us here."

Jimmy calmed him as best he could.

Joe grinned over the muzzle of his gun.

"Well," he said sarcastically. "You're not as yellow as your partner anyway."

Jimmy flushed at this insult to Spike.

"You yellow rats," he snapped, and his voice was tense with rage. "You slug a defenseless man on the head, you've got him half crazy. He doesn't know what he's talking about."

Joe scowled, and waved the automatic menacingly as Jimmy wiped Spike's head with his handkerchief. "Easy on the names, young feller, or—"

He never finished the sentence.

Jimmy hurled the bloody handkerchief full in the speaker's face at the same time dropping to the floor. With a staccato crack the revolver spat a message of death over his head. Jimmy crashed into Joe's knees in a perfect flying tackle. They both thudded onto the floor, as the revolver went sliding over by the water barrel. Joe's partner made for the gun, but Jimmy was before him. Still on the floor he thrust out his foot, tripping him neatly. Joe and Jimmy arose at the same time. The latter ducking a wide swing, swung a beautiful uppercut from the hip and Joe went sprawling across the rising figure of his pal. Jimmy made for the gun in the corner and before either had regained his feet, he had them both covered.

The tortured Spike was the first to speak.

"Never mind them, Jimmy, let them and the money go. Get me to a hospital. I'm dying."

"Hold on a minute, old man."

Spike's voice rose to a crescendo scream.

"Get me out of here."

Jimmy's heart sank. His idol—the

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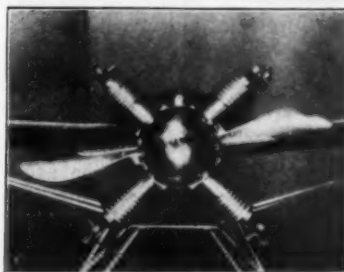
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friend for whom he was risking his life had put his own comfort before duty.

"Wait a minute, old man," he said again.

Spike's only reply was to break into hysterical weeping.

Jimmy waved the gun under Joe's nose.

"Tie him up," he said, indicating the other crook.

USING the cord that had been intended for Spike, Joe complied. Jimmy attended to Joe personally. One at a time he carried them out to the mail plane and laid them none too tenderly in the after cockpit. Then he returned for Spike.

"Where are we going?" asked Spike Hennessy.

"To get the mail through first," said Jimmy, "it's overdue now."

Spike was silent until they reached the plane, then he burst into another feverish speech.

"Get the mail through," he yelled. "What's the idea. I'm dying. I want attention. Never mind the mail. It's got me in enough trouble already."

Despite his realization that Spike was raving because of the injury to his head, Jimmy was cut to the quick to hear his words. He didn't answer.

"Listen," said Spike with all the serious cold sanity of a madman. "Either you take me to a hospital at the nearest town first or I'll never speak to you again."

Jimmy was torn between two conflicting emotions. His duty or his friend. Then for a fleeting moment he visualized that motto over the super's office: *Neither rain nor snow nor heat nor gloom of night stays these couriers from the swift completion of their appointed rounds.* His decision was made.

"No, Spike," he replied, and there was a tremor in his voice. "I'm

sorry, old man, but the mail must go through."

Spike sobbed out a string of curses as Jimmy laid him easily in the cockpit. With his jaw set firmly, Jimmy ignored his ravings, warmed up his engine and taxied across the bumpy grass. In other circumstances his take-off would have given him a thrill of pride but now he was sick at heart.

However, he gritted his teeth, opened the throttle, and pulled back the stick. Up over the mountain top they zoomed, and the United States mail continued its interrupted journey to Cheyenne.

The following afternoon a tall, good looking boy presented himself at the Cheyenne Municipal Hospital and asked to see Mr. Hennessy. As he walked through the white halls, a strange apprehension filled his heart. How would Spike receive him? He had been told that Spike was rational now, but after yesterday could their friendship remain the same.

He followed the nurse into the small room. For a moment they gazed at each other in an eloquent silence. The nurse discreetly retired. Spike spoke first.

"Son," he said. "I was a fool, a hysterical fool. I'm sorry. And if you still want to run mail it's O. K. with me."

Tears of sheer joy welled to Jimmy's eyes as speech temporarily failed him. He held out his right hand in the eternal gesture of friendship. Spike took it, and shamefacedly wiped the moisture from his own lashes.

"Neither rain nor snow," he began tremulously.

"Nor heat nor gloom of night," whispered Jimmy.

"Can stay these couriers from the swift completion of their appointed rounds," they finished in a triumphant unison.

## A Course in Airplane Designing

(Continued from page 42)

the air can pass over and under it easily little power is used up, the ship flies faster and farther, and it performs much better than it would if the wing were rough.

The wing curves in use at the present time are the result of a great deal of patient study and experiment on the part of airmen. The first wing curves were similar to the type shown in Figure A. These gave way to the more efficient type shown in Figure B, and these in turn gave way to the type shown in Figure C. The latter type is especially suited to the model builder as it permits him to put all necessary wing bracing inside the wing covering, doing away with the drag offered by outside struts.

Let me call your attention once more to the importance of wing contour. Do not leave spars sticking

up above the ribs, or other "bumps". Try to make the surface of your wing as smooth as possible.

### Questionnaire

Now see how many of the following questions you can answer.

1. Why is streamline so important to the model builder?

2. A square strut has a resistance of one ounce at an air speed of thirty miles an hour. If the strut were streamlined, approximately how much resistance would it have, at the same air speed?

Ans. 0.04 ounce (1x1/25)

3. Why must the air flow past a wing smoothly?

4. How do the wing curves in use at present differ from those used at the beginning of flying? (See plan.)

5. Give one structural advantage of thick wings.



## The Avenger from the Skies

(Continued from page 21)

and he called out to him. A faint voice answered. Dan was standing close to the crumbling edge of the wall and, when he heard Tom, he leaned out as far as he dared. The rock under his feet suddenly gave away. The next instant he was flat on his back shooting down in a small avalanche of loose rocks.

He caught at a small bush, but his sliding weight tore it out by the roots. It swung him around and now he was diving headfirst toward the precipice. He was more frightened than he had ever been in a falling plane.

THE edge of the cliff was only a few feet away. Then Dan grabbed at another small bush. Its roots pulled part way out, but they held. The loose stones went rolling by and Dan shuddered when he heard them strike in the canyon creek bed far below.

"Hold on! I'm coming!"

Tom's high thin voice sounded close to one side. Tom was on his hands and knees, scraping madly at the scabrock that covered a narrow ledge. The avalanche started by Dan's body had covered the slight crevice.

Dan's arms were numb with hanging onto the bush before Tom finally reached him. He had to let go his hold to reach Tom's outstretched hand and his weight as he swung almost pulled Tom with him into space. But after a bruising roll and slide, he was standing beside Tom on the ledge.

Dan saw that Tom was gasping with the effort he had made and that his hands were bleeding.

"Guess I owe that one to you," grinned Dan. "Another minute hangin' onto that bush and it would have been curtain for yours truly."

"I—I'm glad I could pay you back for what you did," said Tom.

"Forget it," advised Dan. "The next move's up to us. That posse is riding around. They'll be right under us and we'll be easy meat in a few minutes. How are we goin' to get out of here?"

"This crack in the wall goes up, clear to the top," said Tom. "I could have climbed out, but I was afraid some of them were waitin' up there. You don't want me with you—"

Tom looked straight at Dan.

"You mustn't help me—I'm a thief. I—I robbed the bank. You'll get in trouble and you're on the square—I ain't."

"Cut it out an' get goin' up that ledge," growled Dan. "We'll talk about that later."

Clop-clop-clop-clop!

Horses' hoofs were pounding the rocks in the canyon a short distance below. Dan and Tom had scrambled up the crack in the wall and were near the top.

"Spat!"

A bullet struck the rock so close that a fragment of lead stung Dan's cheek. He pushed Tom ahead of him over the edge. The posse was sending a fusillade of shots into the wall when Dan rolled out of range. He heard Simons' voice raised in an angry oath.

"Get back! Get back around!" shouted Simons. "They're both up there and they got over the edge."

The horses were racing back down the canyon.

"C'mon," said Dan. "We've got to run for it. But we'll make it all right."

Five minutes later he was strapping the white-faced Tom into the second cockpit. Before the posse could get out of the canyon and back around, the monoplane was only a taunting speck in the sky to the southward.

Dan thought of the one sure refuge of Boomer Valley. The flat top of Minion Mesa offered a retreat where one man could stand off an army. And then, there were the Mexicans.

In the swift rush of events since he had landed outside Crosscut on the previous evening, Dan had almost forgotten the bandits of Toro Nogales and the stolen longhorns.

When Dan had taxied to a stop on the mesa, he had to lift the limp form of Tom from the cockpit. It was several minutes before he revived. Then he cried like a baby. Dan did not like to see a boy cry. "But I ain't got any right to be helped," moaned Tom. "I'm a thief. Don't you see? I got it coming to—"

"Listen," said Dan. "I know more about this thing than you think I do. You're stayin' right here until a few things get straightened out, an' it looks like it's up to yours truly to play straightener."

Dan realized that Tom was really sick. He needed rest and good food and friends. Instead he was a fugitive being hunted for his life.

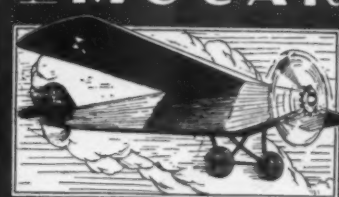
DAN figured he would fix Tom up with a shelter on the mesa, leave him there and fly out. He could make Hollywood and back in a day. He wanted several things, including ammunition and guns. But first he decided to have another look at the box canyon and see if the Mexicans were still there.

Having made Tom comfortable, Dan slipped away down the trail past the eagle's nest. He came to the bend in the ledge from where he had previously watched the rustlers. None of the Mexicans were in sight, but the number of longhorns in the canyon meadow had doubled.

Dan was debating with himself whether he should go farther down the trail or get back, when he heard a quick movement around a shoulder of rock below him.

He whirled to look into the muz-

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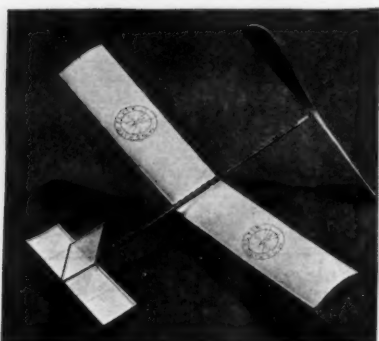
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zles of two rifles and two evil, leering, dark faces. Before he could make a move, a third man sprang upon him and twisted a rope of rawhide around his arms. Then with a rifle point in his back, he was started down the trail.

It was like Dan to think first of Tom's safety. He had seen only the three men who had brought him down, bound his ankles and thrust him into the dark back room of the shake cabin in the pocket canyon. No others had gone up the trail to Minion Mesa, so far as he could judge.

DAN thought it likely that the Mexicans had seen the plane land on the mesa and had started up to investigate when they had come upon him on the trail. All of his captors had accompanied him on the return to the cabin. He hoped they would stay away from the mesa until he could figure out some plan of escape.

Dan talked to himself aplenty for having been such a fool as to put himself in the Mexicans' hands. He had played a dumb trick on himself. He realized that. But it would take more than regrets to get him out of here.

The man Dan believed to be Toro Nogales had issued the gruff order to tie him up. Dan could readily understand the name Toro. In English the bandit leader would have been known as "Bull" Nogales. And for a Mexican he was of unusual size and build. "Toro" loomed head and shoulders above the other Mexicans and he had tremendously broad shoulders.

Dan judged that Toro was partly white blood, and this was true. And he was smarter than the average Mexican. The kind of an outlaw well fitted to engage in affairs where some brains were needed. Dan soon discovered that such an affair now seemed to be at hand.

Toro's voice overrode all the others in the room outside. The rustlers were talking their own language and Dan guessed that they thought he would not understand. But Dan had been around the movie lots long enough to have picked up some Mexican lingo.

He heard Toro refer to someone in the town of Crosscut. Then Dad's name was mentioned and Monty's, Dad's foreman. Dan got it that a big raid was to be made on the longhorns. They were to be driven over the border. Not only were the Mexicans to get the cattle but someone in Crosscut was paying them and Monty.

Dan was glad now he had kept quiet about seeing the Mexicans. He wondered why Dad's riders had not known about the thefts. Here was the answer—Dad's own boss rider was double-crossing him.

Dan heard Toro say a messenger had been sent to Crosscut. He would return tomorrow. He would tell them what to do with Dan.

Dan raged inwardly as he twisted at the rawhide thongs. Simons' name had not been mentioned, but Dan was sure he was the "brains" of the plot. Probably it was all part of his scheme to seize the ranch.

A little later Dan heard Toro's voice outside. One of the rustlers came in and set a plate of beans and some bread beside him. He untied Dan's hands and stood by while he ate. Dan wanted to talk, but he did not want the Mexican to suspect that he understood his language. He was afraid if he spoke he might betray himself.

When he had been tied up again, Dan heard horses galloping away out of the canyon. Voices called back and one man answered. Dan wondered if the Mexicans were preparing now for their big raid on the longhorns? Apparently only one man had been left at the shack to guard him. Dan was glad that none of the Mexicans had gone to the mesa. Perhaps they had reserved that for later, not suspecting that someone else might be with the plane.

The afternoon seemed like a week to Dan. He could hear his Mexican guard putting around in the other room of the cabin. It was growing dark when the Mexican brought him some more stale bread and gave him a drink. The man was silent as he again tied the rawhide around Dan's wrists.

There was no working out of that rawhide. The more he twisted his arms, the tighter the rope became. Dan's legs were deadened and stiff from the tight bindings around them. The rawhide had been wrapped all the way to his knees. Dan rolled over until he could see through the cracks between the thin cedar shakes that formed the side of the shack.

If he could only work loose. The shack wall was hardly thicker than paper and the boards were loose and rattled in the wind sweeping up the canyon. Dan heard the door to the inside room open and the Mexican looked in. Dan lay still and pretended he was asleep. The Mexican grunted and went out.

Dan really slept after a little while. He had been awake all of the previous night. It may have been an hour or three hours. He did not know for the Mexicans had taken his wrist watch. He heard crickets chirping outside. The Mexican on guard was moving around and then Dan heard his boots dropped on the floor and the creaking of a bunk.

The thought that his only guard was about to sleep maddened Dan. But the Mexican apparently had no fear that Dan would loosen the knotted rawhide. Dan worked at the rope until the skin was chafed from his wrists. Failing to accomplish anything, Dan thought perhaps he could rub the rawhide through against one of the rough



boards at the side of the shack. Although he broke out a piece of board, enough that his hands protruded through the opening, the rawhide was too tough to be cut by the rough edge. Dan lay there looking across the canyon. He could see only a short distance in the starlight, but he could make out the moving forms of the longhorns and hear them champing as they fed on the tender grass.

**S**UDDENLY Dan stiffened. A smaller shadow had appeared between the shack and the cattle. It was moving toward him. At first he thought it might be a cougar or a prowling black bear. But it came closer and he saw it was a human form. The shadow crept forward, paused, then came on.

None of the Mexicans would be creeping along in that fashion. Dan waited until the shadow was well outlined, only a few yards away. Then he whistled softly. Instantly he was answered. The shadow separated from the darkness and then he was looking into the white face of Tom Calloway.

The other boy almost sobbed when he was sure it was Dan. With his pocketknife he freed Dan's wrists and in a few seconds Dan had the rawhides loosened from his legs. Dan was about to force the cedar shakes aside and join Tom outside the shack, when another idea hit him.

"Wait," he whispered.

Cautiously he crawled toward the door of the inner room. He listened until he could hear the heavy breathing of the Mexican. Then he opened the door and crept across the other room. He saw the butt of a rifle protruding from the edge of a table.

Five minutes later the Mexican lay bound with the rawhide that had been around Dan's wrists and ankles, and Dan with the Mexican's rifle, his six-gun and two belts of cartridges was on his way up the trail with Tom. Dan had held the muzzle of the rifle to the Mexican's head while Tom tied him up.

Dan was not sure that the rope would hold, but with the Mexican's guns in his possession, that did not worry him.

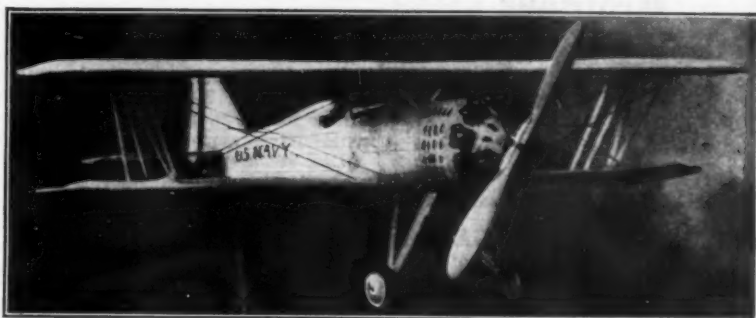
When they had gained the mesa, Dan turned to Tom.

"Guess you've more than evened things up," he told him. "But I'm going to give you a regular he-man's job. The rustlers probably won't come up here if they know the plane is gone and I'm going to leave you here alone for a day.

"I'll leave the rifle and you keep watch at the head of the trail. If anyone, Mexican or anyone else, tries to come up here, let 'em have it. I've got enough gas to get to a landing field and I'm going on to Hollywood. I'd take you out, but I think I'm going to need you here and I'm going to have a loaded plane coming back."

Dan was smiling grimly as he

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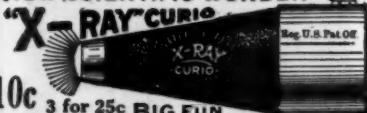
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thought of what that load would consist of.

Tom was scared. Dan could see that. But he had grit.

"I'll stay right here. If they get me, well, they get me. That's all."

Leaving the guns and ammunition with Tom, Dan got the monoplane into the air. No indication of the other Mexicans returning had come while he was preparing to take off.

Dan set a course northwest by the compass. Just after crossing the Sierra Nevada mountains he landed at a small airport and refueled. In the morning he was sitting on the steps of Steinfeldt's office waiting for the Dawnart director.

"Glad you got back," Steinfeldt greeted him. "You're just in time. We've got a fast order to go on location over in your part of the country. Mixed war-western, and we'll need you to double in the air for Grover."

Grover was the leading man of Dawnart. He played heroic roles, but he permitted a double to take all the chances when it came to air stuff.

"Yeah," said Steinfeldt. "We're going to use a bunch of longhorns in that Boomer Valley you're always talking about."

And out of the unexpected assignment Dan had another inspiration, a real hunch this time.

Dan was unloading supplies from the monoplane. He had brought food, a small shelter tent and, more important, two extra automatic pistols with boxes of ammunition. Besides these he had stowed away half a dozen belts of dummy smoke cartridges for the machine gun on the plane and a box of the smoke bombs used for war effects in the pictures.

The remainder of that day and next were passed rigging up a good shelter for Tom under a rocky shelf near the eagle nest. Still there was no sign of movement in the pocket canyon. Twice Dan circled over the place in his plane, but no additional cattle had been brought in.

Where were the Mexicans? What was Simons doing?

Surely the crafty banker-mayor knew that Dan's plane was on the mesa, and he must know that Tom Calloway also was there. Dan felt apprehensive. Something inside told him that everything was too peaceful.

THEN the Dawnart Company arrived and went on location on the farther side of Boomer Valley a few miles from the town of Crosscut. When Dan reported on the third morning after his hop to Hollywood, he fully expected to have trouble. He thought Simons would take some action. But if friends of Simons were among the crowd of curious townsfolk that gathered on the bluff above the movie camp, they did not make their presence known.

Although the picture being made by the Dawnart Company was the story of a cowboy who became a fly-

ing ace in the great war, the war scenes were to be filmed first. Later there would be other scenes of the "cowboy hero" on the range before he entered the war. The leading man, Grover, was first taken in various close-up action on the ground. Grover wore the uniform of the war air ace in this part of the picture.

BUT when the warlike planes took the air for the first battle scene, it was Dan who was inside the ace's uniform flying his "Eagle Longhorn" monoplane, doubling for Grover. The "hero" himself stood to one side willingly, although he was free enough with his criticism of everything his double might do.

Three other flyers were in the scene. Dan's plane was to be attacked by the other three planes, which were painted like German war planes, red wings, black cross and all. In this scene Dan was to shoot down two of the others. They were to fall "on fire", this being worked by having "smoke pots" in the Fokkers' cockpits which would send up a dense cloud at the proper time.

Of course, the planes did not crash to the ground. They fell only while they were in front of the cameras, two of which were in other planes flying nearby. Three other cameras were set on the edge of the high bluff at one side of the valley, and the battle was to be staged close enough to this bluff to enable different views to be obtained.

McKelvie and Sanderson, two of the Fokker flyers, were good friends of Dan's. He had worked with them in several pictures. The third man was a newcomer. Steinfeldt told Dan he had showed up at the Dawnart lot just before they were to leave. He had quickly demonstrated he was a flyer and was brought along. He had given the name of Stanley Harvey.

When Dan had been introduced to Harvey, he had taken an instinctive dislike to the new pilot. The man's black eyes went over Dan with scornful quickness, as though Harvey were thinking, "Huh? You a flyer? A kid like you?"

But Dan had no time to worry about the new man's opinions. The peace of Boomer Valley had suddenly been converted into war. The three Fokkers were up, hovering at around 10,000 feet. The camera planes were swinging in low circles around the area in which the battle was to be fought. Dan took off, zoomed for altitude, straightened out at around 2,000 feet and then began banking in a shorter circle that kept him between the camera planes. He was now being filmed as the "hero" on a patrol trip over the enemy lines.

Suddenly shells began bursting near Dan's plane. Puff balls of smoke appeared and spread. Dan had dropped the plane for this part of the scene to a bare 200 feet. The bursting shells were supposed to be Archie fire from the Germans' anti-



aircraft guns. They were really explosive rockets filled with harmless smoke-producing powder.

As he occasionally closed the throttle of his motor, Dan could hear the crowd from Crosscut shouting. They were getting all the kick of real warfare out of this make-believe. Then Dan pulled stick and zoomed. The imitation Archie bombardment was too low for safe maneuvering in battle against the Fokkers. When he had gained sufficient height, Dan straightened out again.

He saw the first Fokker coming, diving. From this time on, the whole play was up to the flyers. No set rules from the script of the play could govern what might happen to give added thrill to this part of the picture. It must be a go-as-you-please battle, with the lone flying "hero" opposed by three of the enemy.

A shadow fell across the cockpit. Dan out of the tail of his eye could see one Fokker and then another. They had spread out, streaking down on his tail. The camera planes were nearby. Thin lines of smoke shot past Dan's wings. The dummy tracers from the Fokker machine guns. The smoke lines came from above on both sides and crossed over. Theoretically, Dan was being shot down.

That is, until he pushed his stick hard forward and went into an outside loop. To do this, he gave the motor all it would take, dived and continued turning until he was flying upside down, but still coming over. In a flash he had reversed the positions of the planes. The two Fokkers were beneath him, the fuselage of one directly in the sight rings of his machine gun.

DAN pulled his trigger ring and held it. That Fokker was done. The smoke tracers showed that it had been vitally hit. Black smoke whirled from its "pot" and down it went like a falling leaf. One of the camera planes followed, "taking" it, even to the assumed agony on the face of the Fokker pilot.

But the other Fokker had rolled, standing on one wing tip, and was coming head-on for Dan's plane. Dan knew that was McKelvie. They had often pulled this stunt. McKelvie raised his hand and Dan responded. Tracer bullets streamed from both their guns. To the spectators below it must have looked as though the two planes would crash.

But Dan and McKelvie knew their stuff. When they were within yards of each other, Dan pulled his stick sharply and he knew that McKelvie was pushing his stick forward. The "Eagle Longhorn"

shot over the other plane, so closely that from a ground view it looked for an instant like they had really merged into one. It was a trick that required nerve and the best of judgment. Any slip and there might have been a crash, or Dan could have been thrown into a head stall and a bad spin.

THAT slip came, but not from either Dan or McKelvie. The third Fokker had been lying in wait overhead. Just as the two planes passed each other, this Fokker darted toward Dan. It was no moment for foolhardiness, even if this was supposed to be a battle. Dan already had his plane "off its feet" from the sharp zoom. He was in a position where he must ease himself back to a level keel to prevent the head stall.

A head stall means that the plane had been nosed too far upward, that the wings have flattened against the wind and that it may be suddenly turned over backward. This same thing is done in a loop, but not so quickly. And Dan's hand was easing the stick when the third Fokker streaked in front of his nose.

That must be the new flyer, Harvey. Dan knew that neither McKelvie nor Sanderson would have pulled that dangerous stunt. Dan's speed had lessened when his wings flattened against the air, but there was still grave danger of striking the diving Fokker. And Harvey had not pulled his trigger ring. No smoke tracers were playing, as they should have been while he had Dan in his sight rings.

All that Dan could do to prevent the crash was to continue to pull his stick back. He had not planned on a loop and the stall had thrown the plane clear off balance; to go over meant that nothing could prevent a bad spin. He was barely 2,000 feet up.

Having blocked Dan for just that part of a second needed to put him in trouble, the Fokker was gone, its pilot pulling the plane out of its dive.

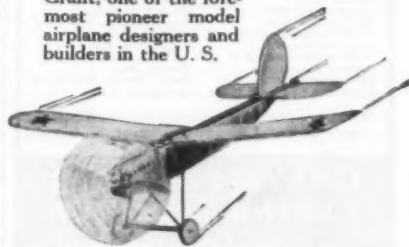
Dan was going down. He could feel the prop fight the wind for an instant and then seem to let go as the cushion under his wings was lost altogether. He had the sensation of falling backward.

Even then, Dan thought grimly, there would be a lot of kick in the picture. But there was nothing in the movie script that provided for a washout and a dead "hero."

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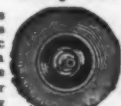
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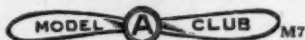


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# MODEL AIRPLANE Dictionary

By W. C. KELLER

**T**HE following are the more commonplace terms used in model airplane building:

**AIRFOIL:** The contour of the surfaces of a wing. The cross section of a wing.

**AMBROID:** The most common model airplane cement. It is very strong and light.

**ANGLE of ATTACK:** The acute angle between the wing chord and the airstream.

**ANGLE of INCIDENCE:** The acute angle between the wing and the line of force. This angle is constant.

**BALSA WOOD:** A South American wood that is one-half the weight of cork and one-third the weight of white pine. Because of its light weight and great strength it is a favorite material for model airplane construction.

**BAMBOO:** Familiar to us as used for fishing rods. When split into long thin pieces it is ideal for fin frames, landing-gear, etc. When split, the shiny side should always be on the piece to be used, as this is the strongest part of it. It can be bent over steam or dry heat, care being taken not to char the bamboo, and to have the shiny side on the outside of the bend.

**BANANA OIL:** A thick liquid solution of celluloid used to cement paper to wing frames and any other place of that sort. It is also used to make dope.

**BANK:** Any airplane regardless of size, when turning, must have the wing on the inside of the turn lower than that on the outside, in order to insure an even turn without skidding.

**CAMBER:** The bend or curve of a surface such as wing, tail or propeller face. A model with a cambered wing will develop more lift than a similar one with a flat wing. A model with a cambered wing often has a stabilizer with a negative or inverted camber in order to insure greater stability. Model airplane props must be high pitched because of the slow turning motor. If the faces of the prop are cambered, the result will be a greater efficiency.

**CEMENT:** See Ambroid.

**CENTER of PRESSURE:** The imaginary line along the span of a wing, about one-third of the chord from the leading edge, at which the wing gets its main lift. The center of pressure and the center of gravity should coincide.

**CHORD:** The width of a wing.

**COMMERCIAL MODEL:** A flying model with an enclosed fuselage inside of which the motive power is contained.

**DIHEDRAL ANGLE:** The angle which the wings make at the center. Dihedral increases the stability of the plane and slightly reduces the lift. Because of the lack of a pilot in a model, dihedral is necessary for good performance.

**DOPE:** Banana oil is thinned out with acetone and is used to shrink fabric or paper on frames to make them tight and waterproof. This solution is called dope.

**FIN:** The fixed vertical rudder at the rear of the airplane that keeps the plane in straight or uniform circling flight.

**FLYING STICK MODEL:** A model with only the essential parts. The wing, tail, prop, landing gear (if any) and rubber motor are all mounted on the motor stick.

**FUSELAGE:** The body of a plane.

**GLIDER:** A motorless airplane that "slides down" an air cushion. In Germany they have been perfected to such an extent that men have actually remained in the air for as long as fourteen hours.

**GLUE:** See Ambroid.

**JAPANESE IMPERIAL A light and strong paper very popular as a covering for model aircraft.**

**LEADING EDGE:** The front edge of a wing or tail surface.

**LONGERONS:** The main body spars.

**MOTOR STICK:** The spar that holds the rubber motor.

**MUSIC WIRE:** Steel wire of great strength. It is obtainable in many sizes.

(Continued on next page)



**PIANO WIRE:** Same as music wire.

**PITCH, PROPELLER:** The theoretical distance a propeller travels forward in a straight line if rotated one complete revolution in a solid mass.

**PLANE:** From wing-tip to wing-tip is a plane. Generally called a wing. A monoplane has, as its name implies, one plane.

**PONTOON:** A light, streamlined, waterproof float used either in two's or three's to support a seaplane while on the water.

**REAR HOOK:** A stationary music wire hook at the end of the motor stick opposite that which supports the prop.

**RUBBER MOTOR:** Most model builders use twisted rubber strands to power their models. This is the lightest, and cheapest method available and is most satisfactory. The duration records we now have, made last June in Detroit, Mich., were made with rubber driven models.

**"S" HOOK:** A metal (piano wire) hook in the shape of the capital S. One loop is used for the rubber, and the other for hooking to the rear hook.

**SCALE MODEL:** A copy of a large ship, usually non-flying.

**SPAN:** The distance from wing-tip to wing-tip.

**SPAR:** A construction member, usually made of wood.

**STABILIZER:** The fixed horizontal tail surface. This surface keeps the airplane stable when climbing or diving.

**STREAMLINE:** The shape of a body that offers a minimum of resistance to an air current.

**STRUT:** A compression construction member.

**THRUST BEARING:** A small bearing to support the prop and to allow it to turn freely.

**TORQUE:** The twisting action that the revolving propeller imparts to the airplane.

**TRAILING EDGE:** The rear edge of a wing or tail surface.

**WASH-IN:** The twist given to a wing so that it has a larger angle of incidence at the tip than at the center.

**WASH-OUT:** The twist given to a wing so that it has a smaller angle of incidence at the tip than at the center.

**WINDER:** A geared-up affair for winding the rubber faster and stretching it at the same time. More turns may be put on in this manner, and thus more power derived from the rubber.

**WING:** One-half of a plane. Thus a monoplane has two wings, and a biplane has four wings. A sesquiplane is literally a monoplane-and-a-half. One main plane and not enough of another to really be called a plane.

**WING-CLIPS:** Piano wire fittings that hold the plane or wing to the fuselage. If the clips are made with different heights, the wing will have an angle of incidence when fastened to the fuselage.

**ZOOM:** The action of climbing at a steep angle.

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## How to Build a Savoia S-55 Flying Boat

(Continued from page 25)

### Tail Rigging

Now go back to the hulls, which should be dry by now. With a pencil sketch in the part that is to be cut out for the wing to set in. With a coping saw, do this carefully to both hulls. Before you are ready to set the wings, cover up the hulls with Japanese tissue. Cover all parts except the part where the wing is to be placed. Dope it with pontoon finisher and set away for about twenty minutes to dry. After that, it will be tight and waterproof. Now get two sticks of balsa  $1/8" \times 1/4" \times 123/4"$ . Measure  $3"$  from the end of the hull and ambroid these strips.

Get two blocks of wood and put under the strip so it will be  $4"$  up from the table. Let this dry

one hour. Then get two good strips of bamboo  $1/16"$  thick. These are to be used for braces. Ambroid these strips at the beginning of the  $1/8" \times 1/4"$  longeron. Now cross them the same as you would for bracing a twin pusher fuselage. Ambroid them where they cross and also at the longerons as shown. Now get two more strips of bamboo, cut to the right size as shown in drawing, and ambroid these at each end tip of the hull. Now fit in the braces and place them the right distance apart as specified in drawing.

Block S shown in drawing 8 should be fastened temporarily with a pin until the plane is tried out. This is necessary as some adjustment may have to be made. If the plane climbs too much, move the



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block back a trifle. If it does not climb enough, move the block forward a trifle or whittle it down.

Where the outriggers join the hulls designated at Q in drawing 8, ambroid 1/16" bamboo strips from this point Q on each side to point R on the opposite side to form a cross brace between the outriggers.

**Tail**

Draw out the shape of the rudder and elevator on a piece of wood or celluloid. Use the model pins to hold the bamboo in shape. First bend to shape over a candle flame all the necessary parts for the empennage and set it away to dry. Put in the bamboo braces as shown in the drawing and allow to dry for a few hours. After they are well shaped and dried, cover all parts on both sides. Now lay the elevator flat on the table, ambroid the rudders in their proper places and then set the middle rudder in its place. Set aside to dry. Be sure they are upright and that the tail is not warped.

**Motor**

The motor is made of formers. Cut five formers out of 1/16" thick balsa. These are easy to make as shown in the drawings. After this is done, put a motor clip at each end and then cover and dope the nacelle. Now mount the motor above the center section and ambroid the mount to

the sides of the ribs as shown in drawing. Use pins to strengthen it. Allow to dry for two hours.

**Assembling**

Now take the wings, slip them into the proper places in the hulls and ambroid them securely. Let dry for about two or three hours. Ambroid the tail to the rigging, as shown in drawing, and give the elevator 1/4" angle of incidence by using a block 1/4" square. Ambroid it to the rigging.

**Motor Stick**

The motor stick is made from a strip 1/8" x 1/4" x 17-1/2" long: one thrust bearing at an end, a can in the middle and a motor hook at the end.

**Propeller**

The propeller is made from a block 1-1/2" x 3/4" x 10-1/4" long of either pine or spruce. Cut it to shape as a standard propeller to turn anticlockwise.

Use twenty feet of 1/8" flat rubber for the power. Now assemble the whole thing. Be sure everything is strong and firm. Take it down to a lake and wind it up about 100 times to see how it taxis into the wind. If good, wind up 300 or 400 turns, face in the wind and watch it sail and fly.

**How to Build a Curtiss Falcon Biplane**

(Continued from page 8)

the drawings. The N struts are fastened together with ambroid as shown in drawing 9.

**Assembly**

In assembling the plane, the N struts are first fastened to the lower side of the upper wing on the third rib in from the wing tips, with the front of the strut 1/2" from the leading edge of the wing and 2 1/16" between the two legs of the N. The center section struts are fastened with ambroid to the two center ribs, the upper end of the front two being placed 1/2" from the leading edge of the wing on the lower side. The upper ends of the two rear struts are fastened 1/2" in from the trailing edge but on the same ribs as the two front struts. The aileron struts are fastened to the second rib from the wing tips 1/2" in from the trailing edge. The lower wings are attached to the wing mounts by ambroid, making sure that there is a one degree dihedral angle as shown. The upper wing is now set in place and the front center section struts fastened with ambroid to the former 4, one inch apart. The rear center section struts are fastened to former 6, one inch apart. The N struts

are secured to the second rib from the wing tips of the lower wings with the front leg of the struts 1/4" in from the leading edge and 1 1/2" between front and rear legs. The aileron struts are fastened with ambroid to the first rib in from the wing tips and 3/8" in from the trailing edge of the lower wing.

**Motor Power**

The motor stick is made from a piece of 1/8" x 1/4" x 13 1/2" spruce, with the thrust bearing and rear motor hook placed as shown in drawing 8. The rear hook is made and bent to shape as shown from a small piece of No. 9 music wire. Ambroid and silk thread are used to fasten these parts to the motor stick. Be sure to cut the slot in the motor stick as shown in drawing 8, as this slot holds the motor stick in place while the plane is in flight.

**Propeller**

The propeller is carved from a balsa propeller block, size 3/4" x 1 1/4" x 7 1/4". First lay out the diagonal lines as shown in the drawing and carve to the shape of a standard propeller, as shown in



drawings 9 and 10.

The finished propeller, after having been given a smooth finish by fine sandpaper, should be given a coat of banana oil before propeller hook is inserted and fastened. The propeller hook is bent to shape from No. 9 music wire and, after being inserted through the center of the propeller hub, should be bent as shown in the dotted lines in drawing 8 and then drawn back into the propeller hub. A drop of ambroid will hold the propeller hook in place and prevent its shifting. Two 1/4" copper washers are slipped on the propeller hook and the hook is then inserted through the thrust bearing. The washers prevent the propeller from becoming stuck to the bearing and give an even surface for the propeller to turn on. The rubber motor consists of 10 strands of 1/8" flat champion-

ship rubber. When a hand winder is to be used, an S hook should be made for the rear end of rubber motor so that rubber and winder can be fastened and unfastened easily and quickly.

If a 5 to 1 ratio hand winder is used, put on only one hundred turns, which will mean that there are exactly five hundred turns on the rubber motor and this is sufficient to fly the plane from a rise off the ground position. When inserting the motor stick, wiggle it to make sure that the rear notch on the motor stick is in place and will hold tight.

The U. S. Army Falcon as used in the Air Corps today has orange wings and olive drab fuselage.

In using colored dope, it is advisable to purchase the best so that ship will not be warped out of shape.

## Macfadden Aviation Advisory Board

(Continued from page 45)

internal bracing in skeleton form and covered with Irish linen.

It is best to use pure para rubber of the flat variety in making models. It has a third more power and gives twenty-five per cent more turns than the square.

Robert Kronfeld, a German, in his glider, "Vienna", established the world's record at the Tenth International Glider Contest, flying 150 kilometers (about 93 miles) and reached a height of about 4,400 feet.

We now will continue with the list of war planes:

### France (Continued)

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Caudron twin tractor for bombing, two 200 h.p. Hispano-Suiza engines  
Caudron C.23 twin-engined tractor for night bombing, two Salmson C-U. Z9 250 h.p. engines  
Caudron G6, twin-engined biplane of the tail pull type, two 80 or 110 h.p. LeRhone engines  
DeMarçay biplane, single-seater scout, fast, 300 h.p. Hispano-Suiza engine  
Donnet flying boat, type D.D. for bombardment, 200 h.p. Hispano-Suiza engine  
Dorand reconnaissance biplane, two-seater, 8 cyl. 190 h.p. Renault engine  
Farman, Type F50 B.N.2 twin-engined biplane, night bomber, two Lorraine-Dietrich engines  
Farman, Type 50 B.N.2, twin-engined tractor biplane, night bomber, two 240 or 275 h.p. Lorraine-Dietrich engines

F.B.A. flying boat  
Hanriot 3C2, two-seater, tractor biplane, fighting scout, 230 h.p. Salmson engine  
Letord, Type 5, twin-engined, tractor biplane, bomber, 240 h.p. Lorraine-Dietrich engines  
Letord, Type 9B.N.2, twin-engined, tractor biplane, night bomber, two 350 h.p. Liberty engines  
Morane Saulnier, Type 27C.1, single-seater parasol monoplane, single gun fighting scout, 160 h.p. mono. Gnome engine  
Morane Saulnier, Type 29C.1, single-seater parasol monoplane, two guns fighting scout, 160 h.p. mono. Gnome engine  
Nieuport, Type 28C.1, single-seater scout, high speed and quick biplane, 160 h.p. mono. Gnome engine  
R.E.P. "Parasols"  
Paul Schmitt biplanes, bomber, Salmson radial or V-type Renault engine  
Spad, Type 7, single-seater, tractor biplane, fighting scout, 150 h.p. Hispano-Suiza engine  
Spad, Types 13 & 17, single-seater, tractor biplanes, fighting scout, 220 h.p. Hispano-Suiza engine  
Spad, Type 12, single-seater, tractor biplane, fighting scout, 220 h.p. Hispano-Suiza engine  
Teller flying boat with "Maori" Sunbeam-Coatelen 350 h.p. engine, for anti-submarine patrolling  
Voisin, four-engined biplane, Type 13, night bomber, four 230 h.p. Hispano-Suiza engines  
Voisin, two-seater, night bomber, 280 h.p. Renault engine  
Voisin, Type 12B.N.2, four-engined biplane, night bomber, four 220 h.p. Hispano-Suiza engines

### German

A.E.G. bomber, two 260 h.p. Mercedes engines (biplane)  
A.E.G. Armoured biplane for offensive patrols against infantry, 200

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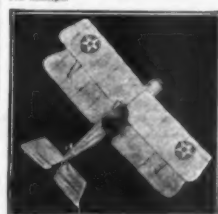
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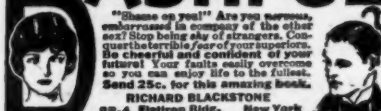
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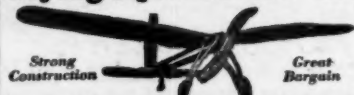
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—O—

A few letters and answers follow:

Dear Sirs:

There is a question I would like to ask. In making a model airplane, why shouldn't the front of a wing come to a point like the back. It seems that a pointed front should have less wind resistance than the rounded one.

Yours respectfully,  
NORMAN RICH,  
432 E. 47th St.,  
Los Angeles, Cal.

Answer:

There is no reason at all why the leading edge of a wing should not come to a point. In fact, many designs carry a knife-like leading edge, particularly speed planes and army planes, which, perhaps, is not obvious in photographs but a look at the planes, themselves, will convince you of this.

Dear Sirs:

I have had an argument with a friend of mine. He said that a Wright "Whirlwind" motor whirled around with the propeller. I told him that was just the name and that it was stationary on the fuselage.

Yours truly,  
CLYDE K. NICHOLS, JR.  
Breezy Lawn,  
Rehoboth, Mass.

Answer:

You are the winner in the argument with your friend about the type of motor in the Wright "Whirlwind" airplane. The name "Whirlwind" has no special significance with reference to its whirling around with the propeller, as it is a stationary motor.

Dear Sirs:

If an object on an airplane, such as the struts, landing gear and wheels, were flat and the flat side to the wind, on which side would be the most wind resistance?

Yours truly,  
CHARLES L. BESECKER,  
R. R. No. 7,  
Greenville, Ohio.

Answer:

Obviously, the side which faces the wind would offer more resistance than the side away from the wind. It is for this reason that all parts of an airplane which, when the plane is in motion, face the wind, are streamlined.

Gentlemen:

Please tell me how to tell how fast an airplane can go by the horsepower of the motor?

What is the largest airplane factory in the United States?

Is the Junkers airplane factory the largest in the world?

Yours truly,  
MALCOLM BOSHACK,  
16 Allen Boulevard  
Great Neck, L. I.

Answer:

It is not generally possible to tell how fast an airplane can go by the horsepower of the motor because, oftentimes, one airplane might be fitted with a much larger engine than another, yet because of its general design not develop half the speed. That is to say, the Ford Tri-Motor, for instance, might carry three 525 horsepower Wasp engines, yet not attain such high speed as a Lockheed Air Express fitted with one Wasp engine.

We have no record of which is the largest airplane factory in the United States, although it is generally conceded that the Ford plant at Detroit deserves that appellation.

The Junkers airplane factory is not the largest in the world.

## The Sport of Glider Flying

(Continued from page 22)

word "glider", as the ordinary conception of the term is that it means steadily losing altitude until the plane lands, just as an airplane glides or volplanes to the ground when the power is cut off in the air. The name of sail plane is coming into use in Germany to describe the soaring types.

There are three types of motorless planes, or gliders, the primary, secondary or intermediate, and the advanced type. The primary is the true glider. The inherent stability of these is so great that it is practically impossible to sustain any serious injury in them provided instructions are followed. They rarely rise over twenty feet and usually

lose altitude until they land, and sometimes travel great distances, depending of course on the height and slope of the ground. Boys of sixteen years or more can easily handle them. They are open and the student sits in a seat in the front. The construction is such that repairs may be easily made if damaged. The wing spread is usually around 35 feet and 5 feet in width, and the whole glider weighs about 200 pounds.

The next step is the secondary or intermediate type, which is capable of soaring flight, and has an enclosed fuselage and cockpit. The wings are somewhat longer and less in width than the primary type. The weight



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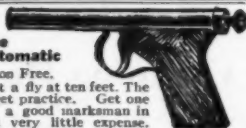
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of this type is about the same.

After mastering this the student passes to the advanced type which usually has a cigar shaped fuselage, and very long wings, made narrow to avoid eddies. The Darmstadt has a wing spread of 59 feet. This is the machine used by Peter Hesselbach in making the record flight for America of 4 hours and 5 minutes over Cape Cod last year.

**T**HE weights of this type run between 200 and 400 pounds, but the wind surface is great enough to sustain this weight and rise with the upward currents of air.

The controls of all types of gliders are the same as those in airplanes. The stick controlling the ailerons when moved from side to side and the elevator when moved forward and back. The rudder being controlled by the feet on the rudder bar. The control surfaces are relatively larger than those on airplanes to be effective at the lower speed traveled.

Some remarkable flights have been made in this type, and much has been learned about air currents with them. It seems that this machine has solved the problem of the soaring flight of birds.

At present most gliders are equipped with skids instead of wheels for taking off and landing, which answer the purpose as the speed is comparatively slow.

The first requisite of glider flying is suitable terrain, i. e., hills or slopes to deflect the wind upward, and of course, clear spaces for taking off and landing. Incidentally it has been discovered that there are many upward currents of air where there are no hills, usually caused by warm air rising, sometimes from an object on the ground where it is heated by the sun. Under cumulus clouds there is found upward currents of air, and when the flyer is able to reach these currents, he can remain for hours, literally riding the clouds.

The most favorable place for a take-off is the brow of a rather steep hill or slope facing the prevailing winds. Along the sea coast the winds are steadier. At present the method of starting is with a long rubber rope having an iron ring fastened in the middle which is caught in a hook on the front of the plane, and several men or boys pulling on each end catapult the plane into the air, and as it passes over the rope the ring drops out of the hook freeing the plane.

The best plan for a group of boys wishing to take up this sport would be to form a club under the direction of some glider association which will provide the necessary instructions and up-to-date data.

The club idea is admirably adapted to this sport as it is not only much less expensive, but the members are available to assist in taking off.

If possible one member could be sent to a glider school where a short

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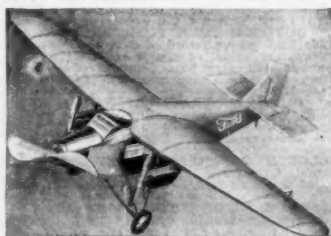




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course in gliding and glider construction can be taken. He can then act as instructor to the other members. Courses can be had covering a continuous period of ten days or taken on weekends and holidays.

Doubtless there will be found in the United States some exceptionally fine locations for glider flying and we will soon begin to hear of new records in this country.

In locations where the terrain is not suitable for glider flying, there is the possibility of using gliders with small motors from 5 to 20 h. p. It is claimed that the Darmstadt sail plane needs but 1-1/2 h. p. to sustain it in the air and with a 15 or 16 h. p. motorcycle engine its performance is remarkable. This type of craft has reached a high state of development in England, where low consumption of gas is quite an item.

A number of good ones have been built with only 5 or 6 h. p. motors and weigh less than 500 pounds loaded.

After attaining sufficient altitude these planes can be flown in the same manner as the sail planes, with the power shut off, and will glide long distances.

Glider have been successfully towed by airplanes and some clubs are taking off by being towed by an automobile, but this should only be attempted by experienced glider pilots.

Glider flying in the advanced type ranks high in the realm of true sport. Yachting, skating, skiing and the like, have their thrills, but what compares with soaring with the birds, silently, high in the air, dependent on your skill and knowledge of air conditions to keep aloft?

## How to Build a Camping Hut

(Continued from page 40)

courses of approximately 6" and lay on your shingles.

Nail on your sheathing as far as the nailing ties on the sides and shingle over them with courses of approximately 6".

Cut the horses for the front steps according to the details and locate them at front door so that they are

3' 6" apart. Cut 2 x 10 x 16 ft. for treads into 4 ft. lengths and nail them on.

Erect bunks according to plans and individual desires. No provision is made in the plans for the bottom of bunks, as some prefer canvas and some slats or a solid bottom.

Stain may be used on the shingles.

### Necessary Materials

8 pieces	2 x 6 x 16 ft.	sills
13 pieces	2 x 6 x 16 ft.	joists
2 pieces	2 x 6 x 16 ft.	girder
3 pieces	2 x 4 x 16 ft.	stud sills
1 piece	2 x 4 x 14 ft.	stud sills
8 pieces	2 x 4 x 16 ft.	plates
4 pieces	4 x 4 x 8 ft.	corner posts
13 pieces	2 x 4 x 8 ft.	outside studs
5 pieces	2 x 4 x 16 ft.	outside studs
3 pieces	2 x 4 x 16 ft.	nailing ties
1 piece	2 x 4 x 14 ft.	nailing ties
2 pieces	2 x 4 x 16 ft.	gable studding
1 piece	2 x 4 x 12 ft.	gable studding
2 pieces	1 x 6 x 12 ft.	ridge pole
22 pieces	2 x 4 x 12 ft.	rafters
3 pieces	2 x 4 x 16 ft.	cellar beams
1 piece	1 x 4 x 16 ft.	hangers for cellar beams
320 board feet	1" x 3"	flooring
165 board feet	1" x 8"	side sheathing
8 pieces	1 x 6 x 12 ft.	eave and ridge boards
1025 lineal feet	1" x 2"	lath for roof
12 pieces	1 x 2 x 16 ft.	gable lathing
2 pieces	1 x 6 x 16 ft.	board for between rafters
		at plate
1 piece	2 x 10 x 12 ft.	horses for steps
1 piece	2 x 10 x 16 ft.	treads
14 pieces	2 x 4 x 8 ft.	studs for bunks
8 pieces	2 x 4 x 16 ft.	rails for bunks
2 pieces	2 x 4 x 14 ft.	rails for bunks
8 pieces	1 x 8 x 16 ft.	side boards for bunks
2 pieces	1 x 8 x 14 ft.	side boards for bunks
8 pieces	1 x 12 x 16 ft.	boards for formers for
		concrete piers
3200 4" shingles	18" long	shingles for roof
600 4" shingles	18" long	shingles for gable ends
1500 4" shingles	18" long	shingles for sides
25 lbs.	20 penny headed nails	
100 lbs.	8 penny headed nails	
50 lbs.	4 penny headed nails	









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